The Iron Age

A Chilton Publication

THE NATIONAL METALWORKING WEEKLY • NOVEMBER 3, 1955

Have you looked into industrial TV?
See page 55

VALLEY MOULD & IRON CORP.

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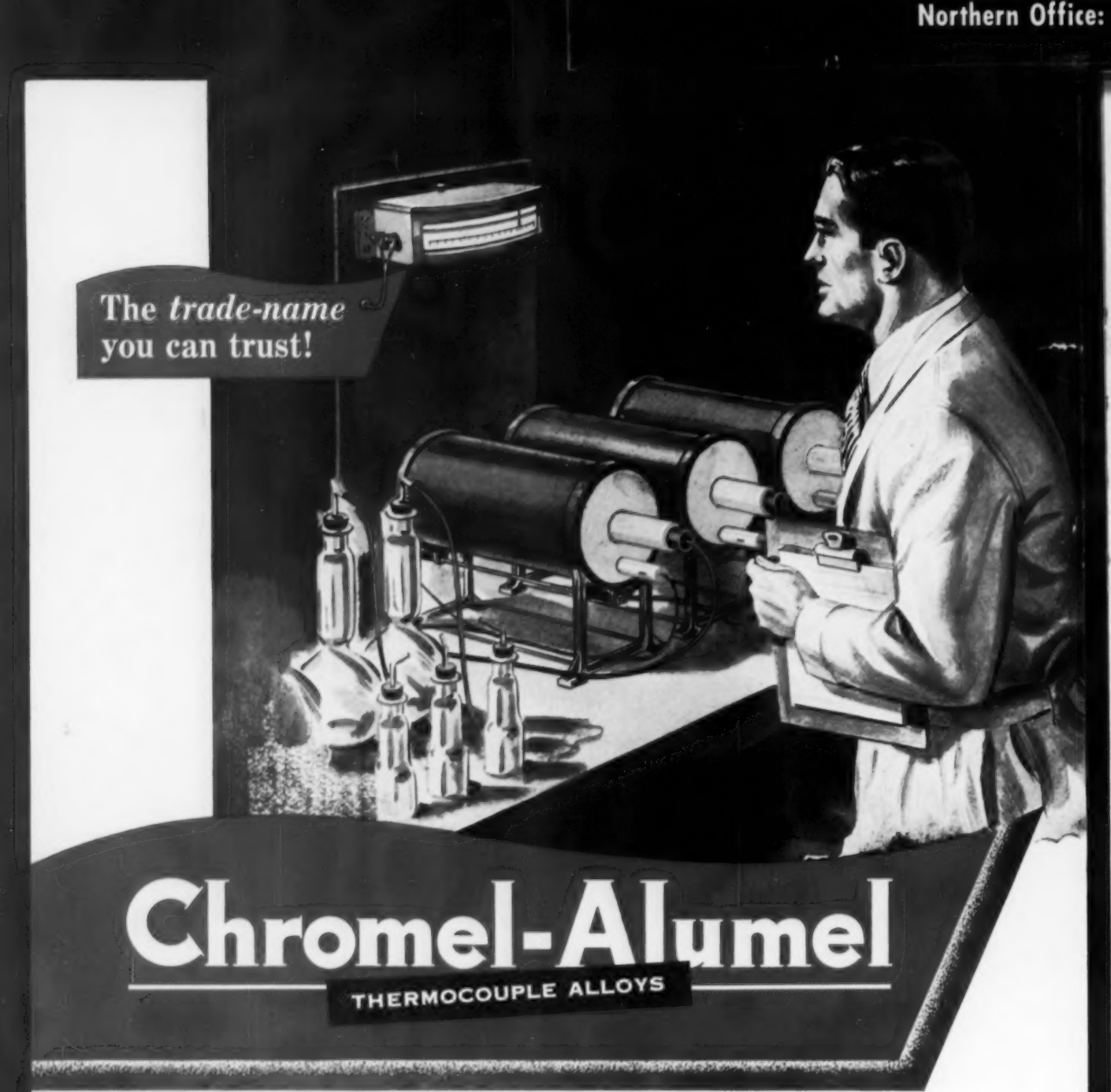


Chromel-Alumel

THERMOCOUPLE ALLOYS

FOR ACCURACY!

Chromel-Alumel thermocouple alloys are unconditionally guaranteed to register true temperature—e.m.f. values within close specified limits . . . ±4°F. from 0° to 530°F.; ±¾% at operating temperatures from 531° to 2300°F.

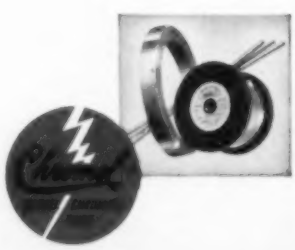
FOR DURABILITY!

They're highly resistant to oxidation, extremely sensitive to temperature variations. And they maintain their fine accuracy over a wider range of temperatures for far longer periods of time than any other base metal material.

FOR ECONOMY!

Despite their finer accuracy, higher temperature range, and longer useful life, Chromel-Alumel thermocouple wire costs the user no more than ordinary base metal materials . . . and in many cases, they actually cost less!

Ask for them by name! Your instrument manufacturer or pyrometer service company can supply your immediate requirements for plain or insulated wire and assembled couples, as well as Chromel-Alumel *extension* lead wire to eliminate "cold-end" errors. So ask for them by name . . . "Chromel-Alumel" thermocouples . . . the trade-name you can trust!



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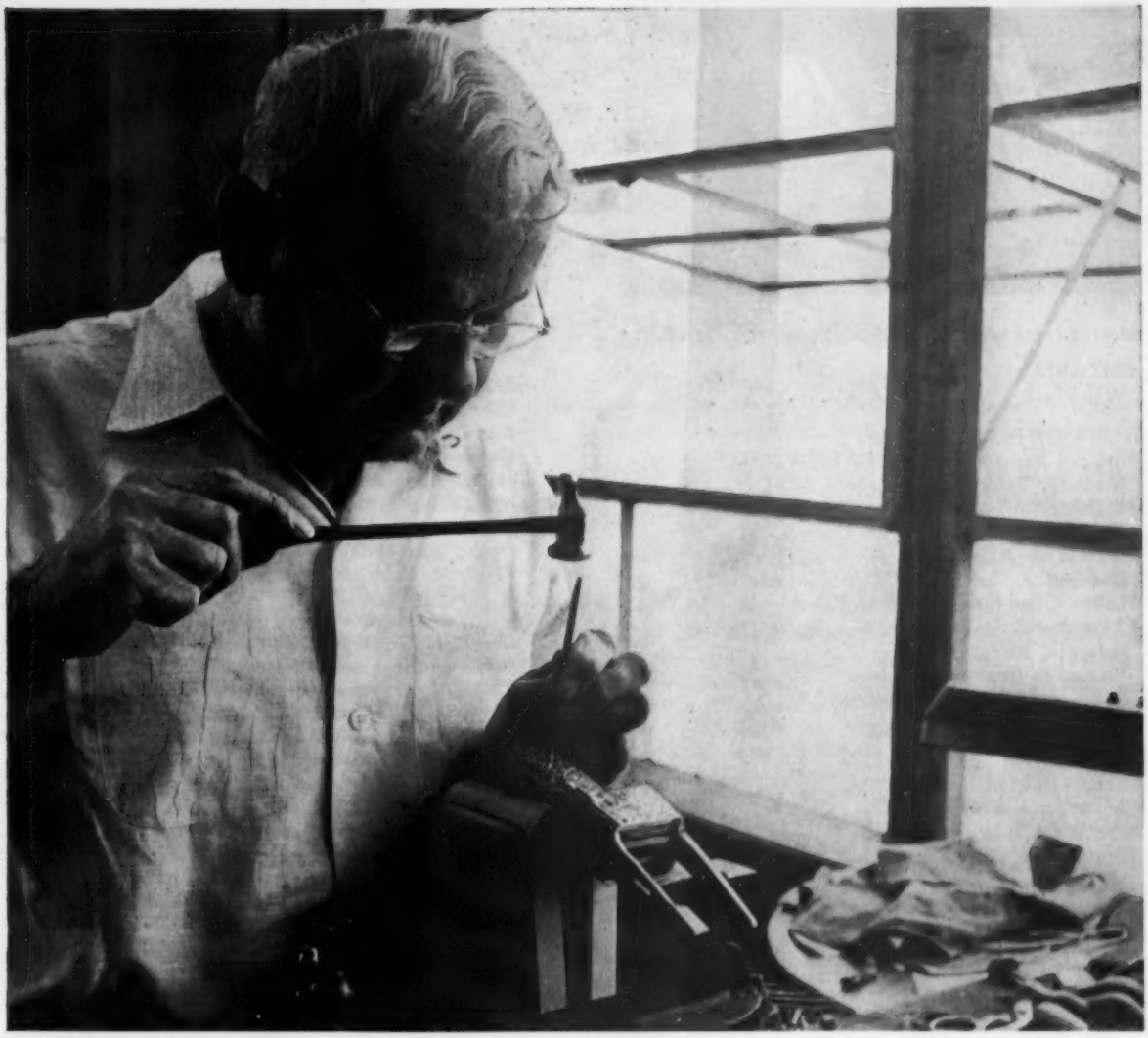

Fine firearms in the making

Like the Yankee gunsmiths of old, firearms makers today are devoted to product excellence. In fact, they are able to turn out weapons to quality standards unheard of in the old days.

A good example is the receiver for a well-known manufacturer's 12-gauge repeating shotgun, which is machined from a 1 7/16 x 2 1/2-in. bar of hot-rolled C-1120 Bethlehem steel.

A few of these receivers are used in making exceptionally fine and costly guns. In the skilled hands of a master engraver they are embellished with intricate scrollwork and beautifully detailed hunting scenes. The assembled guns, truly aristocrats of the sporting world, are highly prized by shooters the world over.

The sporting arms industry is but one of the innumerable active and growing industries whose requirements have created an unprecedented demand for hot-rolled carbon-steel bars. We're doing our best to meet this demand, all the while maintaining the quality standards that our customers expect of products bearing the Bethlehem name.

An engraved receiver of a premium-grade repeating shotgun manufactured by Ithaca Gun Company, Ithaca, N. Y. The ducks are embossed in 24K gold.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

the iron Age

DIGEST OF THE WEEK

Starred items are digested at the right

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Address mail to Chestnut and 56th Sts., Philadelphia 39, Pa.

NEWS DEVELOPMENTS

INDUSTRIAL TELEVISION FINDS WIDE USE — P. 55
Television cameras are peering into openhearths and foundry cupolas. TV is taking over guard duty at plants, serving in control jobs, going places where men can't. Alert selling and improving equipment have brought steady progress to the industry and producers look for a big sales boost in 1956. Equipment prices range from $1000 to $5000. Installation costs about $2000. Special lighting may increase cost.

OFFICE MACHINES BRING TRAINING PROBLEMS—P. 59
Office machines are being used more and more today. They are growing more complex. On top of this, high school students are shying away from business courses. All of which adds up to a growing training problem for industry. Companies using modern equipment will have to start training programs.

COPPER: PRICE CONTROL MIGHT SHIFT — P. 60
Anaconda is ready to spend $38.3 million to develop a new copper source in Chile. But they want their own terms. Chile is on the spot. They need the revenue but they also want to retain their tight control. No matter which way the Chilean Government jumps they are going to find themselves under fire.

STEELWORKERS BACK MCDONALD CANDIDATE—P. 63
Late election returns show Howard R. Hague defeating Joseph P. Molony in a CIO United Steel Workers contest for vice president. Victory was by a decisive margin but loss of key areas shows strong opposition to McDonald within the union.

WHAT'S THE OUTLOOK FOR U. S. MANGANESE—P. 64
This year, domestic producers of high-grade ore will turn out 300,000 tons, will do even better next year. Right now, producers are asking for restoration of 1¢ tariff on foreign imports, a long-range Gov't. purchase program to help set up a stable, growing domestic industry. Nation's vast reserves of low-grade ores are proving amenable to numerous upgrading processes.

CAPITOL GETS SET TO EASE CREDIT CURBS—P. 77
Administration financial experts are keeping a close watch on the economy, plan to lift credit restraints in the next two or three months. Curbs have drawn some complaints from businessmen, who say money is getting too tight. Income tax cuts plus easier credit will bar any real drop in consumer spending next year.

IN METALWORKING

ENGINEERING & PRODUCTION

SEMI-AUTOMATION SPEEDS TANK ASSEMBLY — P. 95
Production of auxiliary fuel tanks for aircraft moves on a fast cycle at Los Angeles' Pastushin Aviation Corp. Operations include forming, welding and machining on three aluminum sections before final assembly. All of the major tank fabrication and assembly areas are tied together by an efficient conveyer system.

MULTIPLE SLIDE UNIT FORMS MANY PARTS — P. 98
Working on coiled strip stock, multiple slide forming equipment at Buick produces a variety of metal clip designs. Output ranges from 80 to 100 clips per minute, and no secondary operations are required. Forming can be spread over as many as four dies to lengthen die life, simplify die maintenance and repair. Strip utilization is excellent. Machines require less floor space and fewer man hours per piece produced.

TITANIUM EXTRUSION—A NEW TECHNIQUE — P. 101
Successful extrusion of titanium implies good surface finish. A Bentonite lubricant of proper consistency proved most effective in producing a scratch-free surface. Die wear—a major cost problem—was checked for a variety of commercial tooling materials. Carbide dies gave best results, proved most efficient. Proper combination of die and lubricant produced smooth, scratch-free bars 6-9 ft long.

NYLON FORMING ROLLS PREVENT SCRATCHES—P. 104
Matching pressure rolls of nylon and steel achieve scratch-free surfaces when prefinished strip is roll-formed. Nylon rolls, machined from stock shapes, cost 40 pct less than hardened steel ones. Here's how one firm forms prelacquered brass strip 0.035-in. thick.

SEAM WELDER JOINS THIN STAINLESS — P. 106
Conventional methods and equipment couldn't handle this all-stainless welding job. Circular sheets only 0.005-in. thick had to be rim-welded to a ⅝-in. thick block. A special resistance welder turns the trick.

MARKETS & PRICES

AUTO SUPPLIERS RIDE OUT MARKET CHANGES—P. 72
Integration trend finds car makers producing more of their own parts. But with car sales booming, the volume of outside buying has increased. Parts makers still get a healthy slice of auto business. Moreover the suppliers have gained strength through mergers and have reduced their reliance on the auto market. Aircraft and other industries now contribute to well-being of independent suppliers.

BRITISH COLUMBIA OFFERS GROWING MARKETS—P. 81
Cheap power and growing population have British Columbia moving forward on industrial and consumer fronts. Big nonferrous expansion is underway. Steel ingot production from scrap will double, as 350 metalworking firms, employing 7000, call for more steel. The province imports $22 million in electrical appliances, turns out $28 million in refined nonferrous.

GOVERNMENT HALTS RESERVE MACHINE BUYING—P. 83
News that the Defense Dept. has decided to hold up purchase of machinery for the mobilization reserve was taken in stride by the industry which generally views the move as an attempt of pre-election budget balance by the administration. Times are good and government contracts are not essential to high profits. But, there is an uneasy feeling that the move could hurt if buying brakes are left on too long.

STEEL MARKET HITS PEAK OF CONFUSION — P. 151
The scramble for steel has reached uproar proportions. Producers and consumers are almost at wits' ends in the grim battle to avert plant shutdowns. Conversion deals are commonplace. Even gray market talk is being heard where vigorous denials were uttered earlier. Producers are running equipment into the ground. Equipment breakdowns are a serious problem. Demand mounts.

NEXT WEEK:

INDUCTION HEATING, A SPECIAL REPORT
This 16-page special feature covers all phases of induction heating in industry. Under separate sections, the subjects of melting, heating for hot forming, heat treating, joining, and core baking by dielectric methods are discussed. Report is illustrated with case histories of these important heating methods.

WHAT'S THE OUTLOOK FOR U. S. SHIPBUILDING?
Big things are happening in shipbuilding. Steamship lines have placed multi-million dollar orders for new bottoms that will improve U. S. position as a maritime nation. What about money being spent to build up our naval forces? What does all this mean to metalworking? Read all about it in next week's issue.

PLYMOUTH

1956 Plymouth Belvedere Four-Door Sedan

PUTS THE *FORWARD LOOK* IN METAL FINISHING

In the Plymouth Division's all new multi-million-dollar V-8 engine plant, where new concepts of quality control and manufacture have been incorporated, a Frederic B. Stevens, Inc., automatic "Little Steve" machine has been installed for tin immersion plating of pistons.

Plymouth's "Little Steve" is also equipped with automatic load and unload devices and can easily handle the production requirements of 1,600 pistons per hour. In fact, the Plymouth machine has been designed so that additional arms can be added at any time to increase the production rate.

"Little Steve" Pays Off

"Little Steve" is a recent development of Frederic B. Stevens, Inc. It is a space-saving, low-cost automatic plating and/or immersion processing machine using arms (as shown in the Plymouth installation) or racks which are placed on the arms. When racks of small parts are used it is capable of processing or plating up to 40,000 pieces per eight hour day.

The size of the "Little Steve" makes for easy installation in most plants. It offers no floor overload or ceiling height problems. Furthermore, it fits in most factory bays between structural members. Small over-all size and smaller tank size means low solution expense. The capital investment is low, too – low enough to enable many companies to now have their own automatic installation.

If you would like further information about "Little Steve" write today to Frederic B. Stevens, Inc., Detroit 16, Michigan, or call your local Stevens Sales Engineer.

"Little Steve" automatic machine for immersion tin plating at the new Plymouth V-8 engine plant.

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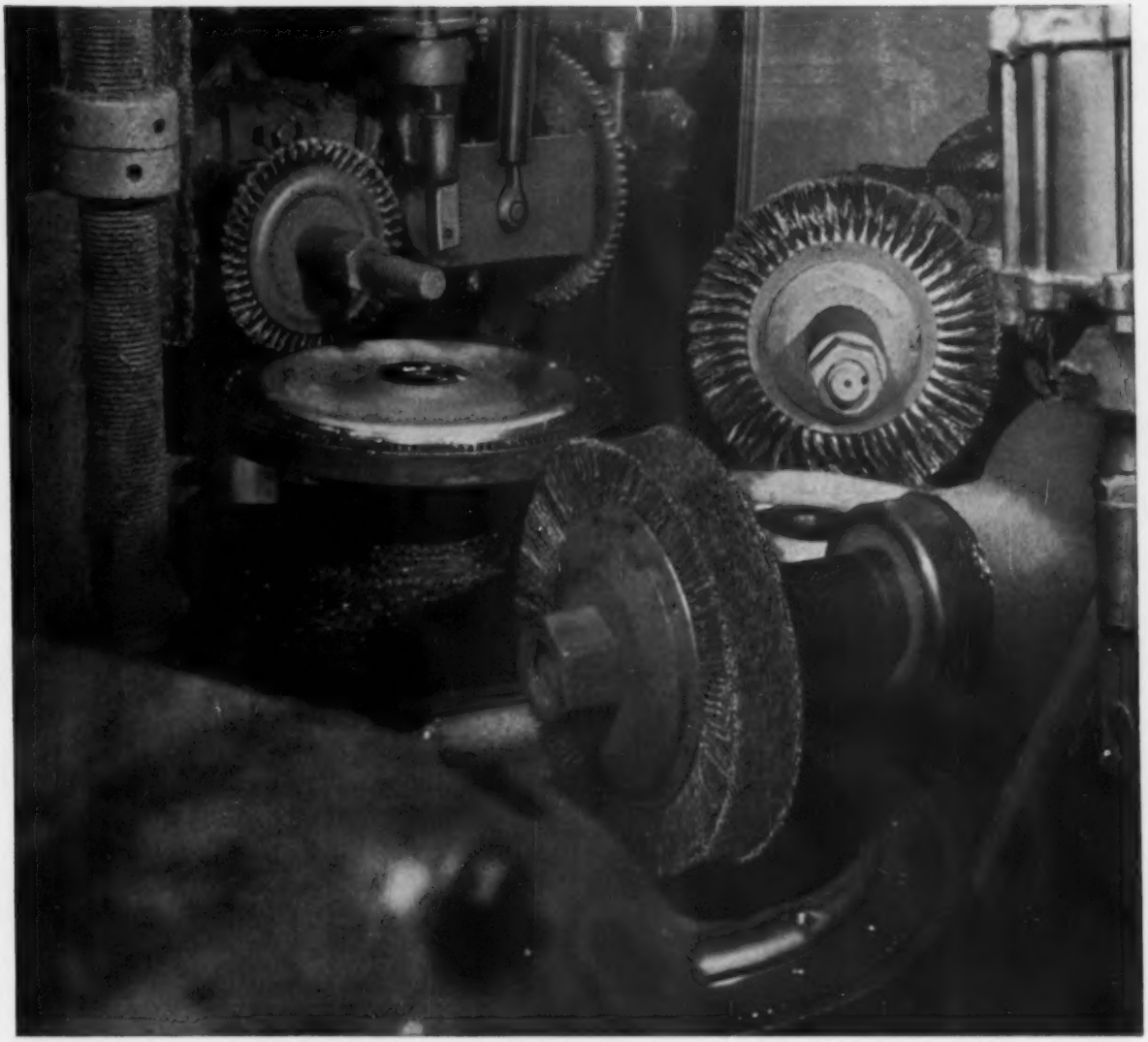

GUARDING TRANSMISSIONS AGAINST BURR DAMAGE

POWER brushing quickly and effectively removes burrs which can break loose in service and cause serious trouble in automatic transmissions.

In the case of deburring holes in transmission cover plates, illustrated above, the operator simply loads and unloads parts after a one minute brushing cycle.

Automotive manufacturers employ a dozen or more semi and fully automatic brushing set-ups to remove sharp corners, blend surface junctures and produce micro-inch finishes here-to-fore impossible with ordinary finishing methods.

An **O**sborn **B**rushing **A**nalysis may point out ways *you* can improve parts quality yet cut costs. Write *The Osborn Manufacturing Company, Dept. F-38, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

Osborn Brushes

OSBORN

BRUSHING METHODS • POWER, PAINT AND MAINTENANCE BRUSHES
BRUSHING MACHINES • FOUNDRY MOLDING MACHINES

A NEWS REPORT

...from the home of FASTEST machining steels

Leaded plates—Now lead has been added to E-Z-Cut plate. As a result, E-Z-Cut, which was already considered one of the best free-machining plates on the market, is better than ever. Tests show that New E-Z-Cut cuts even faster, polishes to a better finish than non-leaded E-Z-Cut. And because sulphur content is much lower, is much cleaner steel. First stocks include thickness up through 3".

Did you know that the largest stocks of Ledloy—world's fastest machining steel, await your call at Ryerson? Our stocks are largest from both a tonnage and size range standpoint. And stocks of other C.F. bars are also in excellent shape.

New sizes of leaded alloys—Increasing demand for New Rycut 50, fastest machining .50 carbon alloy steel has prompted Ryerson to increase the range of sizes in stock. Hot rolled rounds, both annealed and heat treated, are now available in large sizes—up through 9¼". So shafting, gears, cams, etc. can be produced at savings possible only with Rycut alloys.

"Increased production 200% using new Rycut leaded alloy"—"cut unit costs 32% using Ryerson Ledloy"—"reduced machining time 35% with New E-Z-Cut plates." Hundreds of reports like these testify to the savings realized with Ryerson faster cutting steels in shops from coast to coast. And Ryerson engineers will be glad to help you apply these steels to your operations.

You can be sure of getting the latest and best of proved fast-machining steels at Ryerson because, serving the widest market with the largest, most diversified stocks, we are in close touch with every new development.

So if you want to save on the final cost of a machined part—whether carbon, alloy or stainless steel—call the home of fast-machining steels—call Ryerson.

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ABP NBP

Editorial:

Will We Be Sucked In—Again?

◆ AS TOP DIPLOMATS debate at Geneva the world is still at sixes and sevens. The President's health and domestic affairs have obscured some of the hot spots around the world. They cannot and will not be solved by additional "Geneva Spirit."

Last July we wrote a piece called "Are We Being Sucked In?" One of our readers who signed only his initials and gave no address called it "high school stuff." By now it is clear that we were taken in by the Russians—and their smiles.

Many of our government people are frankly worried about the way the Reds have triumphed in the court of world opinion without having done much except act human and quietly furnish fuel for a few international fires. Here are a few problems that face us:

Formosa Straits: This is still a hot spot. War could break out any time the Chinese Reds want it to. They are being held in check by the Russians for the time being.

Korea: The armistice has been violated by the Reds at will. We can do little about it. Korea remains a tinder box.

North Africa: Aided by the Reds, nationalistic groups will make nothing but trouble for the French—and for us. What will happen when nationalists attack or interfere with our air bases in North Africa? Do we fight them, fight the French or stand still and be shot at?

Germany: Mr. Adenauer is sick and may not have long to live. We lost the first hand to the Russians in the German game. We have little to support another try. Russia still holds the cards.

Egypt: The chances for a Palestinian war are not small. The Russian-Egyptian arms deal is more fuel for the Red roasting bee.

We are losing out in Asia. There the Red's stock has gone up and their nuisance value has increased. The Middle-East trouble might be a smoke screen—for the Reds to manipulate their puppets in Europe and in North Africa.

Do we let Russia hold on to the status quo? Or do we plug for an end to Russian satellite colonialism? Will we take the initiative from the Reds? Or do we sink into a diplomatic stupor as the Communists wreck NATO and drive a wedge between us and our allies?

Our leadership in world affairs is being threatened. The Russians will try to topple and replace us by any means possible.

Tom Campbell

EDITOR-IN-CHIEF

Sharonart is BIG NEWS!

TO CHANGE THE Style
CHANGE THE **STEEL**
SWITCH TO *Sharonart*

To designers who haven't already investigated Sharonart*, this page should be "good news."

Here's a steel made to order for imaginative product designers. Steel with decorative patterns pressed into the surface that enhance the appearance of any product. Sharonart* gives an exceptionally fine surface for two-tone painting.

Designers can select from dozens of patterns or make up their own repetitive design which will be reproduced in the surface of the steel. They can choose from almost any type of steel, including stainless.

Hundreds of manufacturers — from cabinet hardware to automobiles—have switched to Sharonart* because it enables them to *change the style by simply changing the steel.*

Get the full story. Ask your Sharon salesman or write direct for the new Sharonart* booklet.

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Sharon, Pennsylvania

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dear editor:

letters from readers

Adult Education

Sir:

My eyes "bugged out" this morning upon reading the title, Industry: Adult Study Pays, in—of all places—your October 20th issue.

After the thousands of words I have used to emphasize the fact that the Government has no money except what it takes from us—to have my hitherto ally tell its readers that because "The Federal Government subsidizes the courses * * * the cost can be very slight,' —WOW! ! *Harry M. Hays, Asst. to Manager, Pullman-Standard Car Manufacturing Co., Butler, Pa.*

We certainly agree with your recent letter that the Government is doing a great many things which should be left to private industry—or to private education. We even find the Government, through the Department of Commerce, virtually in the business of publishing a technical magazine. I can't say that we agree with it and yet we feel that as long as it is being done we will report what the Government is doing. Only way to stop it is to cut off the appropriations.—Ed.

Cartoons

Sir:

Those humorous cartoons are so true to life. But, tell me, why the new twist of hunting and bank hold-up cartoons in IRON AGE. Aren't they a bit out of place? If you must give us humor, let it be Metalworking. Thank you. *Robert Agrillo, P. Sorensen Mfg. Co., Woodside, N. Y.*

Humor is where you find it, though we do try to concentrate on metalworking.—Ed.

Headed for Trouble

Sir:

I am sure that each week you receive many letters concerning your excellent editorials in THE IRON AGE. Many times I have resisted the impulse to write to you.

I was so impressed with the wonderful message contained in the Oct. 20th editorial that I just desired to add my name to the list of your many well-wishers and tell you what a pleasure it is for me to have the opportunity each week of turning to page 7 and reading your thoughts. *Wilbur T. Blair, Vice President and Treasurer, Sharon Steel Corporation, Sharon, Pa.*

"How to Get More for Your Steel Dollar"

Sir:

We would be pleased to receive three copies of your booklet, "How to Get More for Your Steel Dollar." *Henry A. Mueller, Standards Engineer, Engineering Dept., The Monarch Machine Tool Co., Sidney, Ohio.*

Sir:

Several of our product managers have indicated an interest in your recent paper "How to Get More for your Steel Dollar" for use in their organizations. We therefore would like to obtain twenty-five copies of this paper. *J. J. Beinlich, Mgr., Technical Information Section, Research and Technology Div., U. S. Steel Corp., Pittsburgh.*

Sir:

This is the first opportunity I have had to acknowledge receipt of your Centennial issue. I realize the tremendous amount of work and effort that was put into the preparation of this issue and want to congratulate both you and the staff of THE IRON AGE for a splendid piece. This certainly will be one of the books that we keep in our reference file. . . . *R. W. Brown, Advg. Mgr. Eastern Div., Wickwire Spencer Steel Division, 575 Madison Avenue, New York.*

I'M A TOUGH BUYER

BUT GARRETT'S GOT IT FOR QUALITY

No sir, you *can't beat Garrett* when it comes to top quality in small parts. Their "statistical quality control system" means every shipment you get is the finest. But quality is only part of what I like about Garrett. They manufacture and stock the world's most complete line of washers and hose clamps. Boy, when you need any kind of a lock washer, flat washer, spring washer or hose clamp you get it fast . . . most everything right out of stock.

When it comes to stampings and assemblies that's where their high-speed automatic equipment stars. Turns out exactly what you want in no time at all.

Sure, I'm a tough buyer. I want the best. I want it fast. I want it priced right. And Garrett is the place for me.

LOCK WASHERS
FLAT WASHERS
HOSE CLAMPS
STAMPINGS

Manufactured by

GEORGE K. GARRETT CO., Inc.
Philadelphia 34, Pa.

Garrett
OF PHILADELPHIA

Why, in one year, 73 companies paid 28% more for this Baker Gas Truck

The Baker Gas-O-Matic introduces a revolutionary new concept in automatic transmissions for gas-powered fork lift trucks. Instead of a torque converter, it employs a variable voltage generator—integral with the gasoline engine—and an electric motor.

The initial cost of this truck is about 28% higher than conventional clutch-type gas fork trucks. But . . . operating and maintenance costs are extremely low—in line with the higher priced battery-powered electrics. Moreover, frame, uprights, steering assembly, drive axle, etc.—in fact 90% of Gas-O-Matic's components—are standard Baker electric truck parts which always last 10 years or more.

Gas-O-Matic users have proven that

1. Fuel savings, originally estimated by our engineers as 40%, are actually in excess of 50% over ordinary gas trucks.
2. Depreciation costs are less because truck can be amortized over 9 years instead of 5.
3. Maintenance costs are less—no clutch or transmission to wear out and replace—30% fewer moving parts—no complicated electrical system—engine operates at controlled optimum RPM.

These Gas-O-Matic customers recognize the "lower-first-cost" fallacy—many of them have re-ordered for the second and third time—based on their experience with these trucks.

Write for complete information about this unusual fork lift truck.

Baker handling equipment

THE BAKER-RAULANG COMPANY

1227 WEST 80th STREET • CLEVELAND 2, OHIO

A subsidiary of Otis Elevator Company

5GE2

fatigue cracks

by William M. Coffey

Next Attraction

This week we want to tell you about what's coming next week and just this once we hope we can reach all IRON AGE'S 169,238 readers. This is faint hope, however, as latest audited count shows that *our* band of loyal readers has dropped from 23 to 22 just in the past week. *(Cousin Caleb Flerk left in a fit of pique because our wife made a crack at his wife's rabbit fodder and it's certainly a sobering thought to think that such a valuable and famous magazine like* IRON AGE *can rise or fall on things like that.)* But anyway, it's a bit too much to ask our 22 to spread the word to the other 169,216. But we do ask it and it's not so bad when you figure that each of you only has to pass the word to 7691.6 others.

Now, about next week. Next week, THE IRON AGE once again offers you one of its famous specials, a feature issue on Induction Heating. We have the word from Managing Editor Beaudet (pronounced *bowday*, not *bowdebt* because that would not be fr.) that this issue (November 10) will cover the entire field on induction heating possibilities. Many applications that are still in their early stages will be outlined and the entire discussion will be backed up in every instance with a series of case studies. Incidentally, as you must have noticed in the past, our editors strongly believe in the "case history" method of presentation as being of much more value to the reader than the "lecture" method. In other words, they feel (and this is an IRON AGE *unique*) that the way you can best profit from new techniques and methods is to show you how others have done so, thus eliminating costly trial and error on your part. So you will find in this special issue actual case histories that outline the job to be done and the solution, naming names, production rates, and cost or cost savings.

This feature will be in five sections: Melting . . . Heating for Hot Forming . . . Heat Treating . . . Joining . . . and Core Baking. This issue will save you money.

Forecast for '56

In case you have been wondering why this column, unlike almost every other column in the country, failed to predict exactly what will happen in 1956, the reason is simple—we aren't any too sure just what happened in 1955. (We print this now because being very poorly on dates and deadlines we'll most likely forget to print it come the new year, 1956. And not only that, we want to say that we printed it first, this year.)

Puzzlers

Here are a lot more winners to the Oct. 13 puzzler: Roy Green, Kendall Co.; I. M. Darcey; Albert Barolga, Inland Steel Co.; Don Gohl, Oakland, Calif.; J. H. Stanley, Product Designer, The Parker Appliance Co.; Fred P. Boulais, Industrial Engineering Dept., Acme Steel Co.; Worst A. Paulat, Engelberg Huller Co.; John A. Lawrence, Lawrence Brothers; Irvin Poston, Allison Division, General Motors; W. A. Pearson, Time Study Engineer, Royal Typewriter Co.; Robert R. Auray, Chrsyler Corp.; and Francis Forquer and Robert Fitzsimmons of Daystrom Instrument Co. And Abe Raich.

New Puzzler

An old friend Abe Raich of C. F. & I. sends us this one: After a 30-minute delay, a CFA (Caleb Flerk Airlines) pilot arrived at his destination on time by increasing his ground speed 90 mph over the last 200 miles of an 800-mile trip. How fast did he travel the last 200 miles? (Aside to Abe: Enjoyed your editing of our subscription letter very much. Some way to make a livin', eh?)

a significant advance

FOOTE

RIMEX

for producing

RIMMED STEEL

This industry-proved steel additive reduces the cost of producing rimmed steel, with these advantages:

FOOTE RIMEX*

1. *Improves rimming action*
2. *Minimizes ingot growth*
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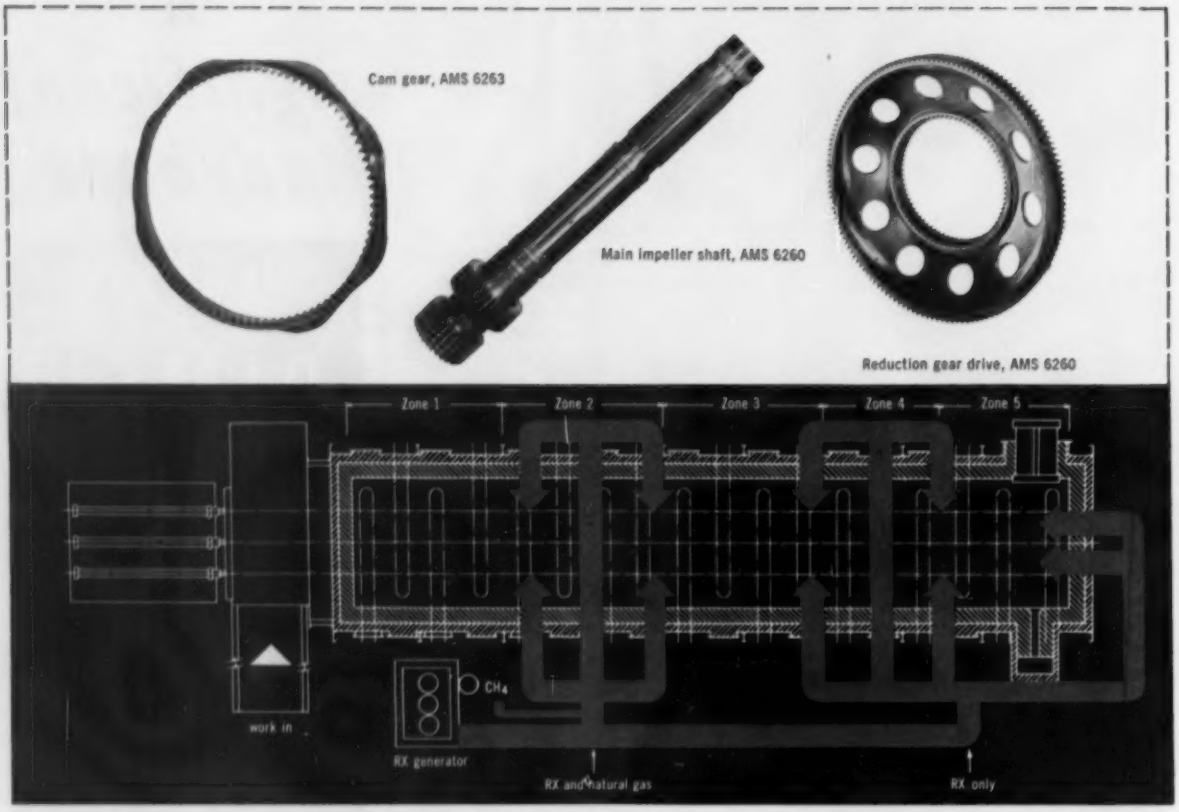

Surface split manifold arrangement which permits controlled variation of carbon potential in different zones of a continuous furnace, using a single RX® generator

'Surface' carburizing holds aircraft tolerances

When your heat treating and inspection standards are tightened to "aircraft quality," it's time to specify 'Surface' precision gas carburizing. It will give you close tolerances and bonus benefits as well—as the manufacturer of these aircraft gears discovered.

A 'Surface' continuous gas-fired furnace, with controlled atmosphere, delivers accurate metallurgical results on every part, the first time. In addition, the furnace can simultaneously process different steel analyses with different case depths. The operator simply varies the automatic cycle intervals on three rows of work trays. Furnace mechanization minimizes operator attention and parts handling—assures that each piece receives the prescribed time-temperature cycle.

Ideal case carbon gradients are achieved by the unique split manifold distribution of atmosphere from a single RX gas generator—a typical example of 'Surface' know-how working for the user.

write today for Bulletin H 55-9

Surface
HEAT TREATING EQUIPMENT

SURFACE COMBUSTION CORPORATION • TOLEDO 1, OHIO
also makers of Jenitrol automatic space heating and Kathabar humidity conditioning units

dates to remember

NOVEMBER

SOCIETY OF AUTOMOTIVE ENGINEERS—National fuels and lubricants meeting, Nov. 9-10, Bellevue-Stratford, Hotel, Philadelphia. Society headquarters, 29 W. 39th St., New York.

AMERICAN COUNCIL OF INDEPENDENT LABORATORIES, INC.—Annual meeting, Nov. 9-12, Westward Ho Hotel, Phoenix. Society headquarters, 4302 East-West Highway, Wash.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS — Annual meeting, Nov. 13-18, Hotels Congress, Conrad Hilton, Sheraton-Blackstone, Chicago. Society headquarters are at 29 W. 39th St., New York.

EXPOSITIONS

1955

SECOND INTERNATIONAL AUTOMATION EXPOSITION—Nov. 14-17, Navy Pier, Chicago. Society headquarters are at 845 Ridge Ave., Pittsburgh 12, Pa.

1956

ASTE—Industrial exposition, March 19-23, Chicago.

MATERIALS HANDLING SHOW—June 5-8, Cleveland.

CONVEYOR EQUIPMENT MANUFACTURERS ASSN.—Technical committee meeting, Nov. 14-15, Hotel Astor, Milwaukee. Assn. headquarters, No. 1 Thomas Circle, Washington 4.

NATIONAL METAL TRADES ASSN.—55th annual convention Nov. 14-16, Sheraton-Plaza Hotel, Boston. Assn. headquarters, 155 E. 44th St., New York.

NATIONAL ELECTRICAL MANUFACTURERS ASSN.—Annual meeting, Nov. 14-18, Traymore Hotel, Atlantic City, N. J. Assn. headquarters, 155 E. 44th St., N. Y.

SALES MANAGERS' ASSN. OF PHILA.—5th annual sales rally, Nov. 17, Broadwood Hotel, Philadelphia. Assn. headquarters, 1307 Land Title Bldg., Phila.

THE AMERICAN INSTITUTE OF CHEMICAL ENGINEERS — Annual meeting, Nov. 27-30, Statler Hotel, Detroit, Mich. Society headquarters, 25 W. 45th St., New York.

THE SOCIETY OF THE PLASTICS INDUSTRY, INC.—Sheet fabricators and formers conference, Nov. 29, Hotel Cleveland. Society headquarters, 67 W. 44th St., New York.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION—Annual convention, Nov. 28-Dec. 1, Boca Raton, Fla. Institute headquarters, 101 Park Ave., New York.

THE MORE KNOW-HOW YOU PUT IN THE BARREL, THE MORE PROFIT YOU TAKE OUT

Useful facts gathered during Oakite's years of experience in barrel finishing are packed like #12 stones in this 10-page booklet covering such subjects as:

PRECLEANING—Good tank cleaning; Good barrel cleaning; Good rinsing saves money.

CUTTING DOWN, DEBURRING—Good solutions; Abrasive media, water and work ratios, etc.

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BURNISHING—Good solutions; Burnishing media, water and work ratios, etc.; How to overcome water hardness; How to keep barrels and media clean; How to prevent rusting, tarnishing and other corrosion.

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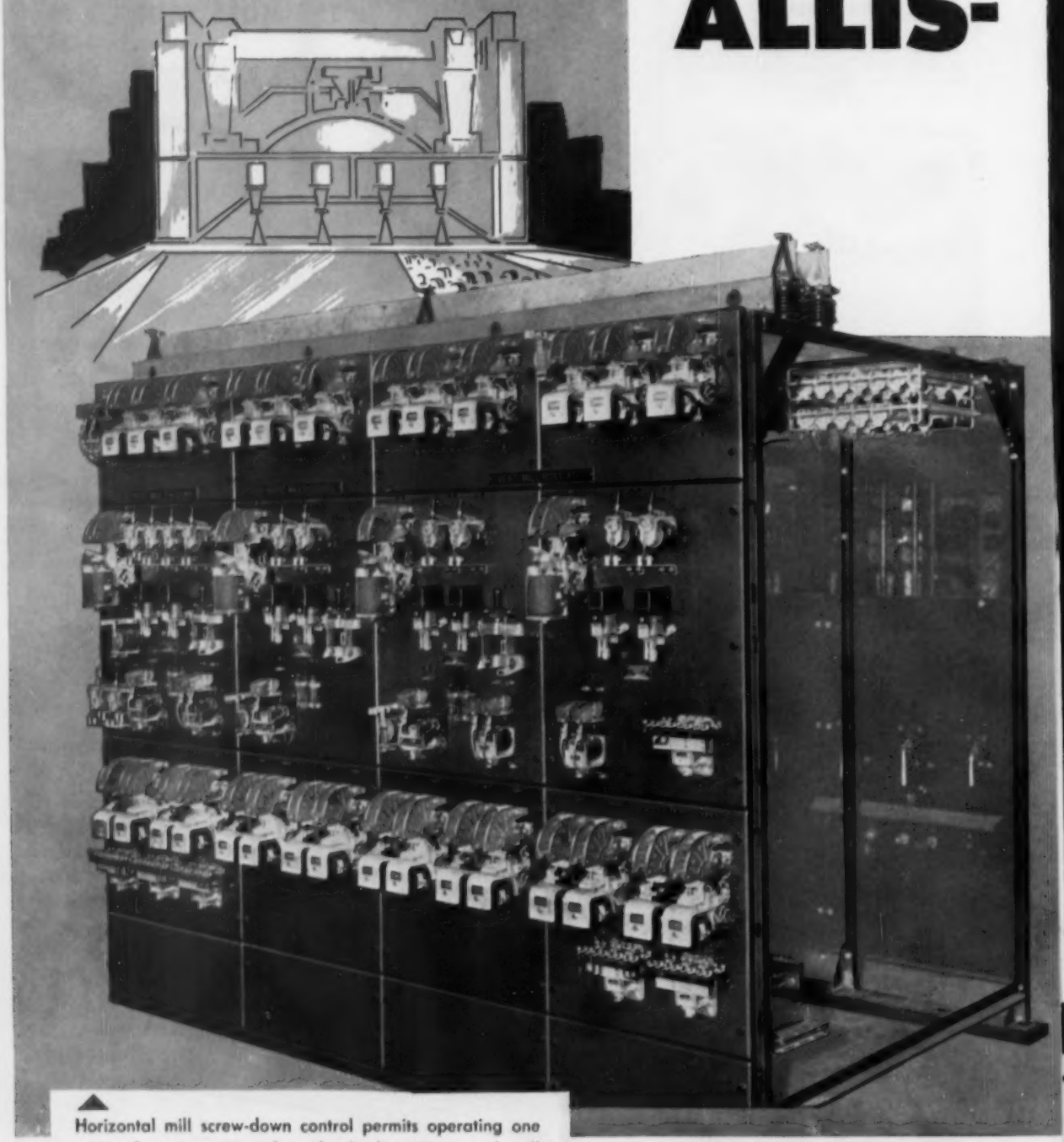
STEEL MILL AUXILIARY CONTROL

Engineered ALLIS-



Horizontal mill screw-down control permits operating one motor for two screws through clutches. Horizontal mill housing adjustment panel is a reversible dynamic braking controller. Vertical mill roll adjustment panels permit operating two motors in unison or individually.

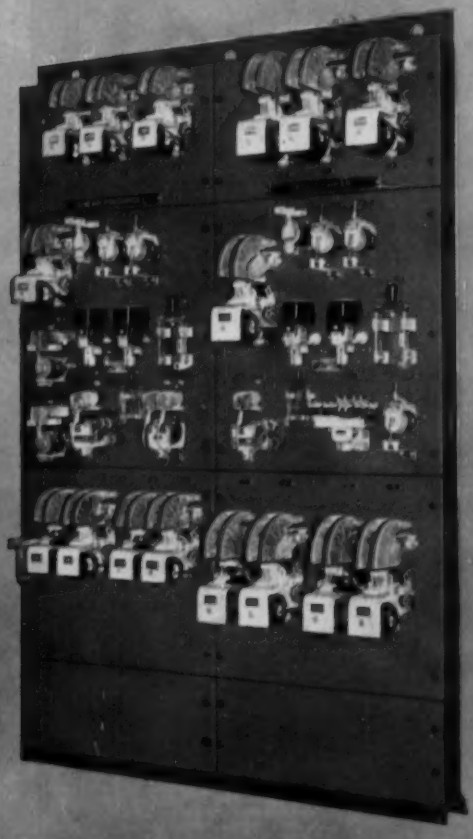
ALLIS-

and Built by CHALMERS

INSTALLED in some of the nation's largest mills, these Allis-Chalmers mill auxiliary controls are providing smooth, precision performance . . . affording maximum production with a minimum of outage time and maintenance.

When you modernize or expand, take advantage of Allis-Chalmers experience and engineering skill in building steel mill control. For further information see your Allis-Chalmers representative or write Allis-Chalmers, Milwaukee 1, Wis.

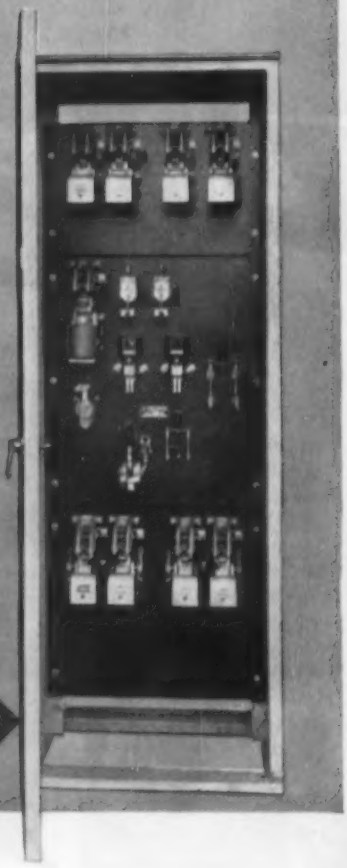
A-4744



▲ Motor control for hydraulic feed pumps. Non-reversible with field accelerating and field decelerating relays.

◀ Two reversible controllers with dynamic braking and series brake for an upcut shear and shear pinch roll.

▶ Reversible dynamic braking controller for roll conveyor. Operates at two speeds in either direction.



A-C ALLIS-CHALMERS

CHALMERS

SIMONDS CROSS-ROLLED STEEL

Makes a Simonds hacksaw blade last longer!

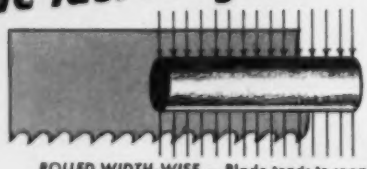
Look for ... ask for the blade with the "RED END"

Test after test proves that Simonds "Red End" Hack Saw Blades last uniformly longer. One reason is Simonds *cross-rolled steel* . . . steel that has a more uniform grain structure for added toughness.

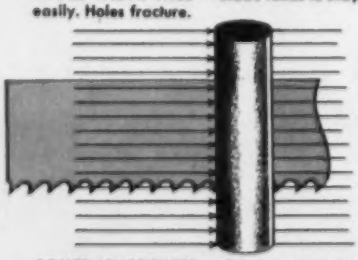
Another reason is Simonds own high quality steel — made especially for hack saw blade use.

Add to this Simonds improved method of tooth setting . . . and Simonds more uniform heat treating . . . and you've got the reasons why Simonds "Red End" Hack Saw Blades last longer, give more cuts per blade, cost less to operate.

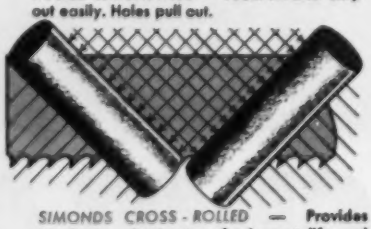
Furnished in all standard lengths and tooth sizes for hand and power use with a choice of High Speed MOLYBDENUM; High Speed TUNGSTEN; WELD-EDGE (High Speed Shatterproof); and STANDARD STEEL (Hand Blades only).



ROLLED WIDTH-WISE — Blade tends to snap easily. Holes fracture.



ROLLED LENGTHWISE — Teeth tend to strip out easily. Holes pull out.



SIMONDS CROSS-ROLLED — Provides toughest grain structure for longest life and resistance to breakage.

For Fast Service from Complete Stocks

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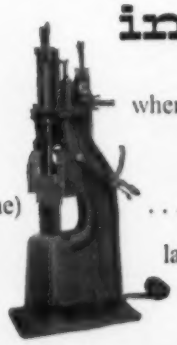
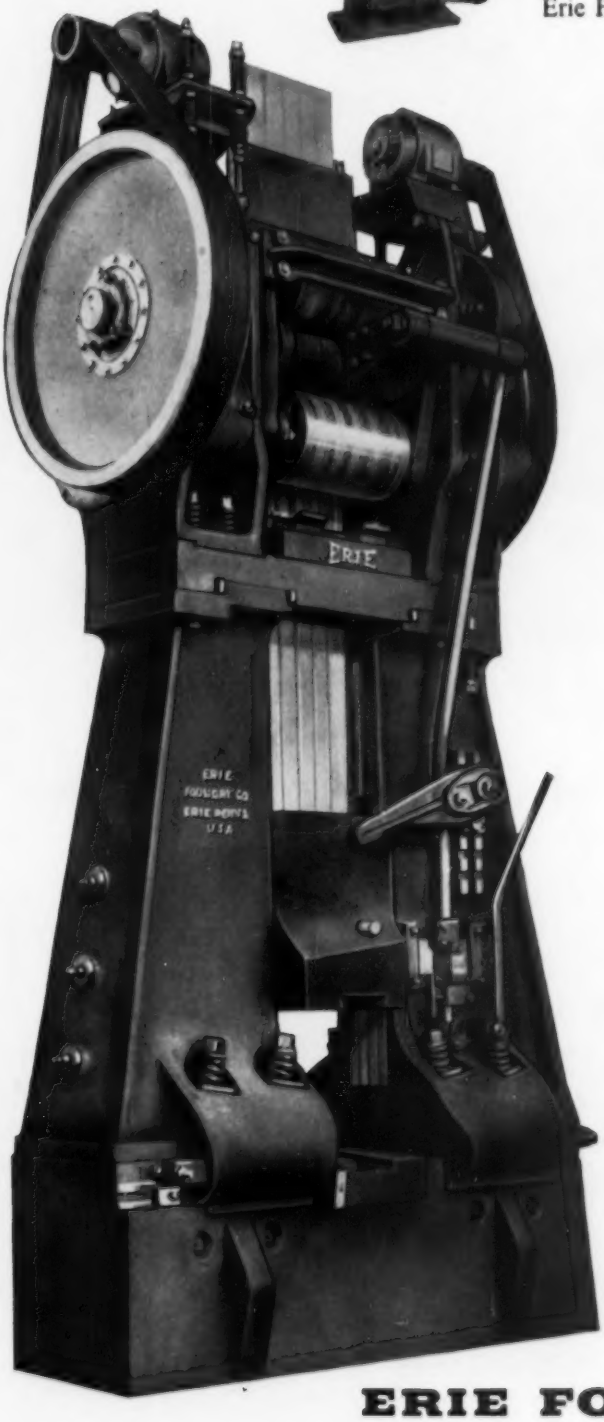
in the good old days



(such as this 100 lb. single frame)

when Erie Foundry was *the first* to use all-steel construction in all our hammers

. . . . . and when hammermen thought a board drop hammer larger than 5,000 lbs. was a wild dream . . . . even then Erie Foundry was a great name in forging hammers



today

Erie Foundry has recently built the world's largest board drop hammer. This 10,000 lb. hammer is at work for Eaton Manufacturing Co's Marion, Ohio forge plant. Eaton is forging 68 lb. net, Flat Back Ring Gears, 16" in diameter, in a single impression die, straight down without blocking or pancaking.

In addition to forging large gears speedily, Eaton likes the Erie 10,000 lb. Board Drop Hammer because the 4-roll lifting head gives longer board life. Air operated board clamps ease the hammerman's job.

As in the good old days, this 10,000 lb. board drop hammer is all-steel . . . and made by Erie.

in our 60th year

ERIE

The Greatest Name in Forging Hammers

ERIE FOUNDRY CO. ERIE, PA.

Your end walls will last longer

with Kaiser Periclase-Chrome Brick

Open hearth operators have discovered two important facts about Kaiser Periclase-Chrome Brick:

1. It can greatly increase end wall life if needed.
2. If end wall service is balanced, thinner walls can be used to reduce cost.

That's because the special composition of Kaiser Periclase-Chrome Brick assures less spalling, less swelling, greater resistance to abrasion and alteration by oxide and slag.

Let your Kaiser Chemicals sales engineer explain how you can get longer life from your end walls or reduced wall thicknesses with Kaiser Periclase-Chrome Brick. Call or write any of the sales offices listed below for immediate attention to your particular problem.

Call or write Kaiser Chemicals Division, *Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: 1924 Broadway,* OAKLAND *12, Calif. . . . 3 Gateway Center,* PITTSBURGH, *Pa. . . . 518 Calumet Building, 5231 Hohman Ave., Hammond, Indiana* (CHICAGO).

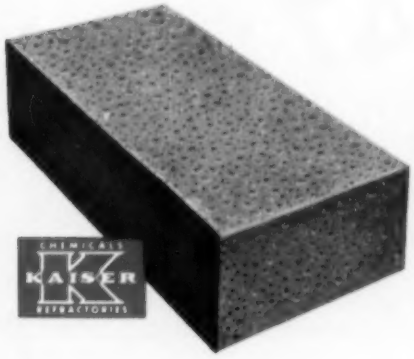
For the ultimate in steel furnace refractories

SOME OF THE REASONS YOU GET BETTER SERVICE WITH KAISER PERICLASE-CHROME BRICK:

1. Chromite content is the minimum amount (only 9.1% Cr_2O_3) necessary to provide thermal shock resistance. Lowering of chromite reduces swelling, thus minimizes end wall buckling.
2. A ceramic bond is formed *before* the chemical bond is destroyed.
3. No liquid phase in forming its ceramic bond. Volume stability.
4. Highest MgO content end wall brick provides greater resistance to carryover erosion and iron oxide attack.
5. Lowest porosity minimizes alteration by resisting penetration of gases and impurities.

think of *Kaiser Chemicals*

Pioneers in Modern Basic Refractories



REFRACTORY BRICK • RAMMING MATERIALS • CASTABLES & MORTARS • MAGNESITE • PERICLASE • DEADBURNED DOLOMITE

Kaiser PERICLASE Brick for the Steel Industry:

- Kaiser Periclase Brick (D-S)
- Kaiser Periclase Chrome Brick
- Kaiser Chrome Periclase Brick

Now available! **A companion mortar for Kaiser D-S brick. High purity periclase composition *and* maximum workability.**

Installation advice on request

NEW ALL POSITION IRON POWDER ELECTRODE

Welds like Jetweld
DOWNHAND

Welds like Fleetweld
VERTICAL & OVERHEAD

Improved

FLEETWELD 47

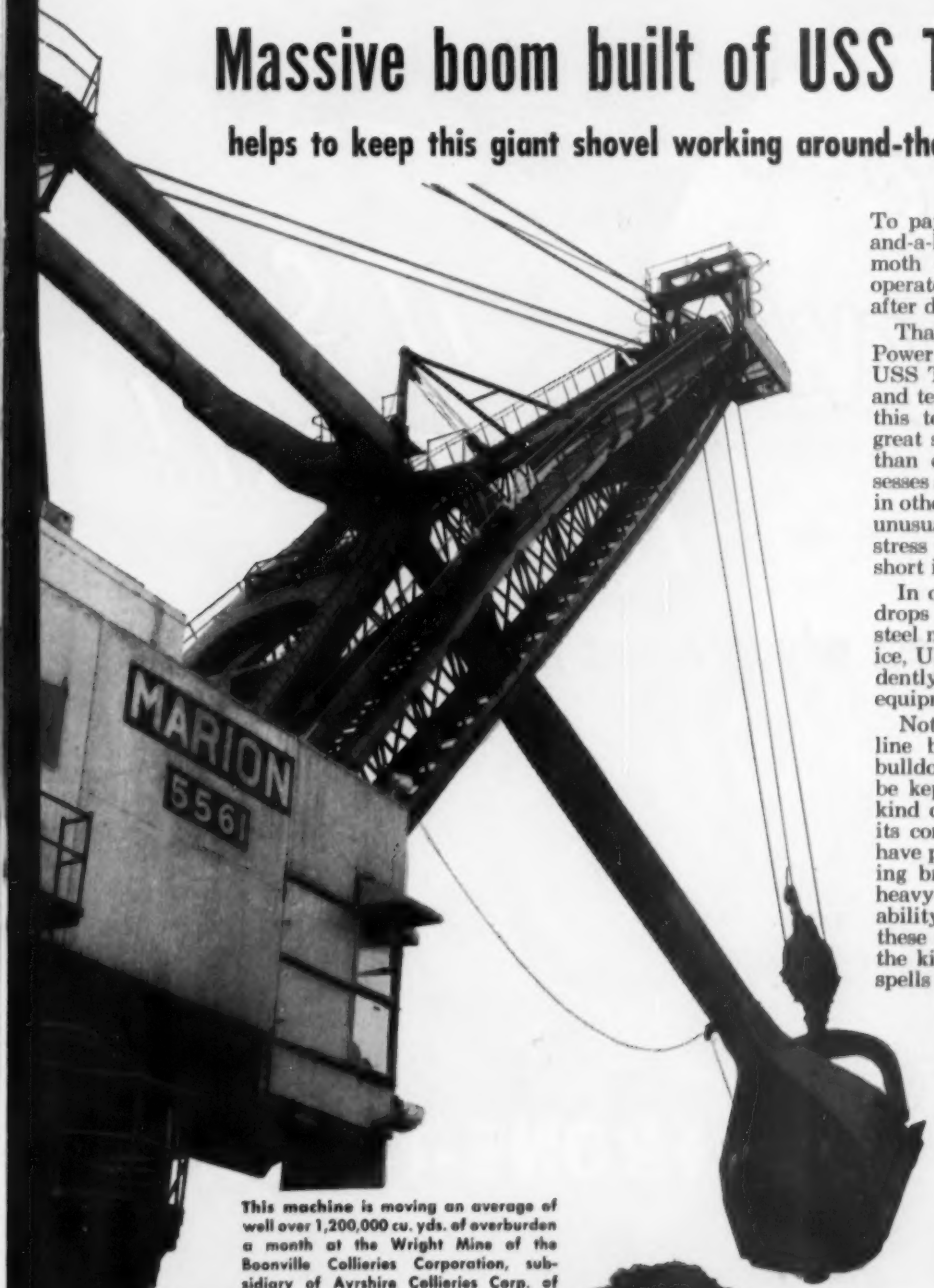
faster, smoother, easier to handle

TRY IT!

THE LINCOLN ELECTRIC COMPANY
Dept. 1510, Cleveland 17, Ohio
The World's Largest Manufacturer of Arc Welding Equipment

Massive boom built of USS TRI-TEN Steel

helps to keep this giant shovel working around-the-clock all year 'round



This machine is moving an average of well over 1,200,000 cu. yds. of overburden a month at the Wright Mine of the Boonville Collieries Corporation, subsidiary of Ayrshire Collieries Corp. of Indianapolis, Ind.

To pay off on the more than a million-and-a-half dollars invested in this mammoth 45-cu. yd. power shovel, it must operate *continuously*—24 hours a day, day after day, every month in the year.

That's why the engineers of the Marion Power Shovel Co., Marion, O., selected USS TRI-TEN Steel for all plates, angles and tees in the massive 120 ft. boom. For this tough, versatile steel not only has great strength—a 50% higher yield point than carbon steel—but in addition possesses an important advantage well proved in other similar construction . . . it has the unusual ability to withstand shock and stress at sub-zero temperatures. Here, in short is a true *all-weather* steel.

In other words, when the thermometer drops to the point where a less efficient steel might tend to crack and fail in service, USS TRI-TEN construction can confidently be depended upon to keep the equipment profitably on the job.

Not only in booms like this, but in drag line buckets, heavy-duty truck frames, bulldozers and power shovels that must be kept working hour after hour in any kind of climate, USS TRI-TEN Steel and its companion, USS TRI-TEN "E" Steel, have proved their superiority by minimizing breakdown hazards. In hundreds of heavy-duty applications, where dependability is of prime importance, the use of these high strength steels has resulted in the kind of uninterrupted operation that spells bigger output at lower cost.

NOW AVAILABLE . . . Our new "Design Manual for High Strength Steels" is ready for distribution. This 174-page book is free. It contains comprehensive and practical information that you will find extremely useful in designing your equipment for greater economy and efficiency by the sound use of high strength steels. For your copy, write on your company letterhead giving your title or department, to United States Steel Corporation, Room 5026, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

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USS HIGH STRENGTH STEELS

USS TRI-TEN • USS COR-TEN • USS MAN-TEN

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UNITED STATES STEEL

it's the greatest advancement in OBI press history

NIAGARA FRONT-TO-BACK

ALL NEW rugged, front-to-back crankshaft with huge crankpins

ALL NEW compact, fully concealed driving mechanism

ALL NEW enclosed, rigidly supported gearing in sealed oil bath

ALL NEW electro-pneumatic friction clutch on crankshaft

ALL NEW wider spaced, longer, narrower gibs

ALL NEW wider, box type slide all within gibbing

ALL NEW precision, hardened, longer-wearing gears

ALL NEW compact, straight-line, space-saving frame

CRANKSHAFT-OBI PRESS DESIGN

Hailed as the greatest achievement in modern OBI press design and performance, by over 100,000 spectators who examined this mechanical marvel at the Machine Tool Show, the all-new Niagara Series E, Single Point, Open Back Inclinable Press starts a brand new chapter in press history.

It's years ahead of any OBI ever built. It's an industrial revolution all by itself. No other press, in modern times, embraces so many "All-New" features.

Gone are exposed, overhanging gears, flywheel and other mechanisms. Gone is excessive and damaging crankshaft deflection. Here to stay are: Full support to wide dies. Greater resistance to off-center loading. Accurate alignment of slide, with minimized tendency to cock. Substantially increased die life. Longer lasting, hardened gears. Smoother, safer press performance. Smaller floorspace requirements.

Built in 4 sizes, with shaft diameters from 4½ to 7½ inches and capacities from 75 to 200 tons, the new Series E is available in both standard models and automation models equipped with the most advanced controls and devices for peak production. A complete description of both, with full specifications, is given in new Bulletin 56, sent promptly on request.

SEND FOR NEW BULLETIN . . .

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

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Dealers in principal U. S. cities and major foreign countries.

America's Most Complete Line of Presses, Shears, Machines and Tools for Plate and Sheet Metal Work.

STANDARD DESIGN
For General Purpose Production

MODIFIED DESIGN
For Automation Lines

CAN THESE SKILLS OF SMALL BUSINESS HELP YOU?

SMALL BUSINESS offers design and development of prototypes as one of its major contributions to nation's economy. At Pattern Products Manufacturing Company, Detroit, C. A. Warner, Sales Engineering Director (left), reviews new product design with R. J. Bennett, Chief Production Engineer.

How American industry can profit from skills

Partnership of small and large business in defense work pays off in expanded talents and facilities at successful Detroit company—now ready to serve other manufacturers

During the Korean conflict, when the Pattern Products Manufacturing Company of Detroit accepted its first General Electric defense subcontract, it had only eighteen people working in a single small plant. It was one of the 17,000 subcontractors and supplies that teamed with G.E. in defense work—and a good example of small businesses that made up 80% of the firms helping with General Electric defense production.

Small business meets the test. Pattern Products was first asked by G.E. to manufacture a special screw jack assembly. It wasn't an easy assignment. General Electric furnished the highly complex design, but the part required precision workmanship. And it was needed fast.

Putting its operation on a 24-hour basis, the company came through. And when G.E.'s Aeronautic and Ordnance Systems operation received the first shipment on time, the part was found to meet all of G.E.'s exacting requirements.

Success leads to expansion. Following this initial test, Pattern Products received other G-E orders. To meet this demand—and that of other manufacturers attracted by its expanding reputation—the company bought and re-equipped two *new* plants out of reinvested capital, hired 109 new people. Their gross sales jumped almost 450% from 1950 to '54. They now stand at an impressive $2,078,000.

Defense production today still accounts for most of the Pattern Products Company's output. But although G.E.'s A&OS was its first major customer—and still accounts for 35% of its business—most orders now come from a wide range of aircraft and associated industries which use the small company's skills in various applications differing from G.E.'s.

G-E help for small business is *typified* by Pattern Products' success. This small company, with skills and facilities developed through working with G.E., is now a more valuable member of America's production team . . . one more example of the partnership between large and small business which keeps America healthy in peace and formidable in war. 649-3

Progress Is Our Most Important Product

GENERAL ELECTRIC

G-E RADAR SYSTEM part requires machining of close tolerances by subcontractor. On-the-spot conferences at Pattern Products bring together skills of men trained in defense orders.

PRECISION TECHNIQUES, such as this boring of aircraft hydraulic system body from aluminum forged billet, helped build company's reputation, increased its value to industry.

one company learned as a G-E subcontractor

ON-TIME DELIVERY, important for both defense and non-defense orders at Pattern Products, is assured by close control of schedules on board shown here.

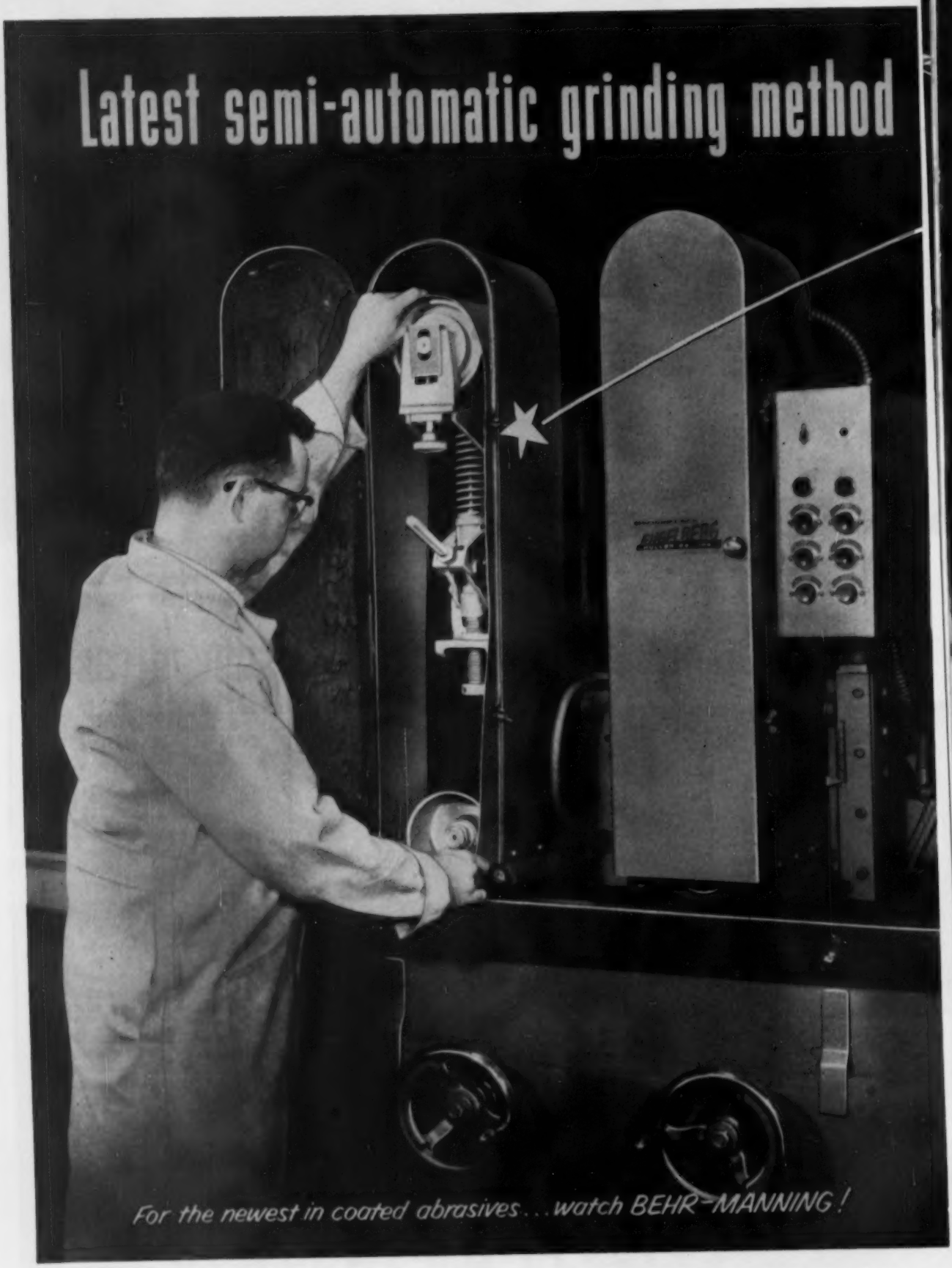
COMPANY'S PRESIDENT Harold E. Hurkett credits G.E. with key role in helping firm's growth. Sales climbed 450% from 1950 to 1954.

EXPANDED FACILITIES— now housed in three modern plants, like one on left—make Pattern Products even more valuable as a defense subcontractor, help increase its contribution to America's peacetime industry.

CAN SMALL BUSINESSES HELP YOU?

Thousands of small businesses, like Pattern Products Manufacturing Co., have furnished General Electric with practically every kind of skill and services as defense subcontractors and suppliers. Many of these companies have available production capacity, created in large part by the reduction of defense orders since the Korean War peak. This means that they may be able to apply their skills to help you with your production.

If you have a manufacturing problem or have work available for subcontracting, please write us on your letterhead stating in as much detail as possible the type of services or skills you require. We will be glad to suggest several small businesses who have done similar work for us and may be able to help you. Write to C. W. Bryant, Manufacturing Services Division, General Electric Co., 570 Lexington Ave., New York 22, New York.


Latest semi-automatic grinding method
For the newest in coated abrasives . . . watch BEHR-MANNING!

.....with the

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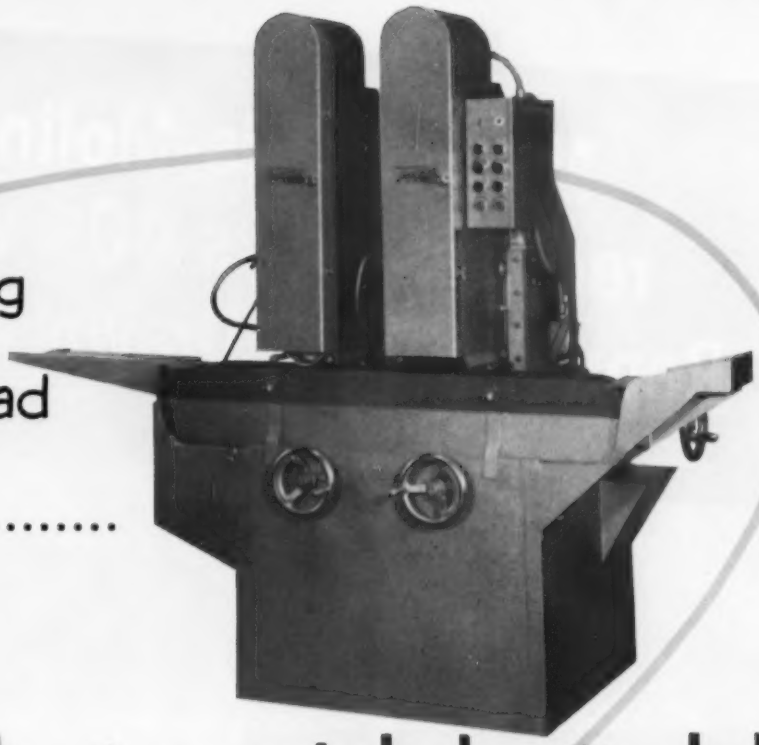
multi-head

machine.....



and Behr-Manning coated abrasive belts!

Here is another modern coated abrasive belt application that's answering industry's demands for increased grinding and polishing production. The conveyor-type Engelberg grinder rolls out flat surface pieces at record-breaking speeds . . . eliminates fixtures . . . and greatly reduces costly set-up time. BEHR-MANNING abrasive belts, smooth the way to superior operations, whether it's rapid stock removal while grinding, or superfine finishes during polishing.

Your finishing operations might require an entirely different abrasive belt application. If so, check with your nearest BEHR-MANNING Demonstration Room for the latest time-saving method. Call your local BEHR-MANNING Representative, or write direct to Behr-Manning, Troy, N. Y., Dept. IA-11.

In Canada: Behr-Manning (Canada) Ltd., Brantford.
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G-9

BEHR-MANNING ® *division of NORTON Company*

▲ COATED ABRASIVES
▲ SHARPENING STONES
▲ PRESSURE-SENSITIVE TAPES

Minneapolis-Moline reduces costs 40% with Republic Cold Drawn Steels!

When you're in a hurry for one piece or a truckload of tool steels, automotive die steels, precision ground flat stock or cold drawn shank steel, *call your Republic Tool Steel Warehouse*—conveniently located in Detroit and Cleveland. Or if you need metallurgical advice, our Republic Tool Steel men are ready to help you work out your problems. Questions on steels, dies, heat treating and machining will be answered expertly and promptly.

When parts require high strength, fine surface, toughness, hardenability, close tolerance or accuracy of section, you get them all in Republic Cold Drawn Alloy Steels—plus UNIFORM MACHINABILITY. Your high-speed automatics can take full advantage of these cost-cutting qualities. Designers can make full use of the high strength and uniform structure produced by cold drawing. Production men get the ideal combination of wearability and strength from the uniform hardenability and toughness of alloy steel.

The power-takeoff shafts on the self-propelled Minneapolis-Moline Harvestor carry a heavy load. Requirements called for a minimum-yield strength of 100,000 p.s.i. It was necessary that these shafts consistently meet minimum requirements in order to eliminate or to minimize failure in service.

In addition, material that had to be stress-relieved, straightened and precision-ground was expensive.

Republic's Field Service Specialists were invited to work on this problem with Minneapolis-Moline Engineers. The solution was a switch to Republic C-1050 Cold Drawn Steel.

Now, the company is getting the proper physicals needed to do the job. And, costs

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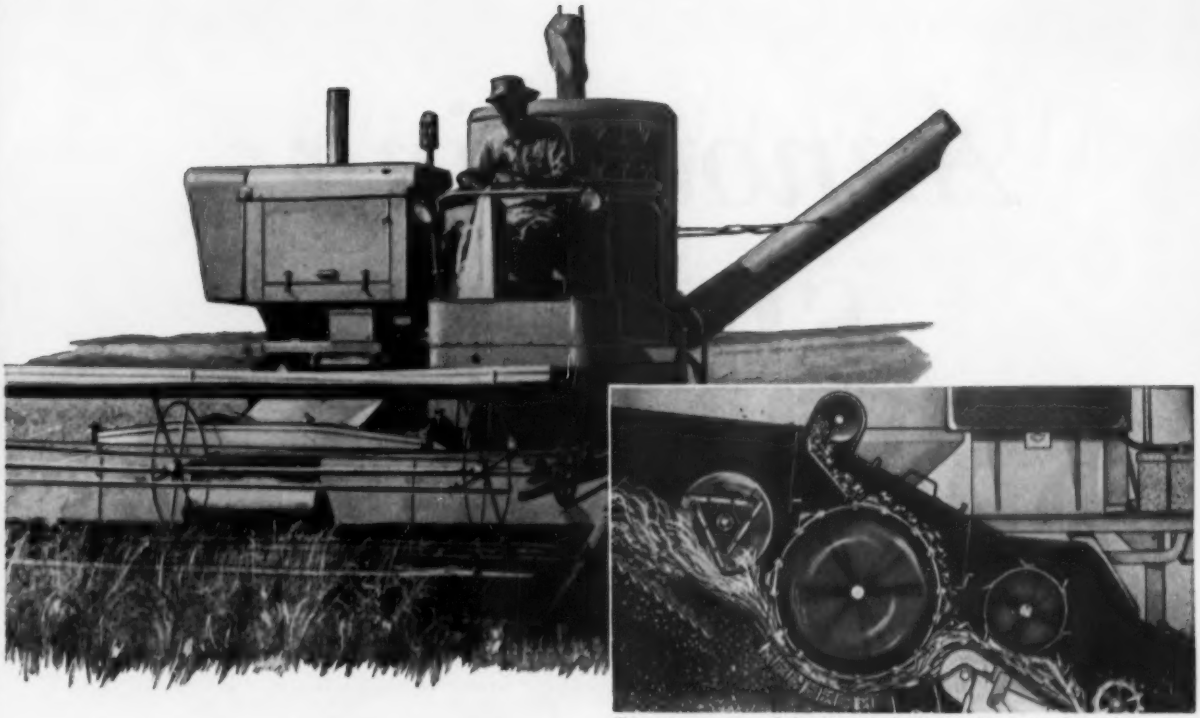
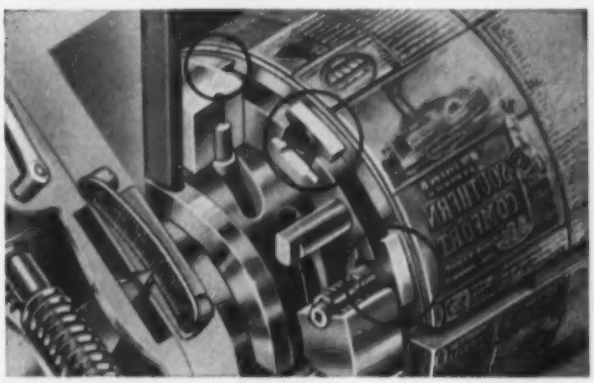


This cutaway view of the Minneapolis-Moline Harvestor shows the power-takeoff shafts made from Republic Cold Drawn Steel.

have been reduced approximately 35 to 40% since the switch to Republic C-1050 Cold Drawn. They buy the shafting in four-foot lengths. The only finishing operations necessary are: threading the ends, key-seating the shaft, and centerless grinding the bearing areas to close tolerances.

Naturally, not all cold finished steel requirements are the same. To make sure that you get the most out of the Republic Cold Drawn Steels you buy, Republic provides a full-time field service staffed by expert metallurgists and machining specialists. They will visit your plant, work with your staff on solving cost and production problems.

Call your nearby Republic sales office for the facts. Or mail the coupon.



Steel parts, like these printing-plate clip bars, are made at a great saving from Republic Special Sections. The bars are cold drawn to predominating cross section of the part. Cold drawing gives your steel parts higher strength, greater hardness and a bright smooth finish. Cutting to length and drilling are often the only operations necessary to finish the part. Sections can be produced in a wide variety of analyses with contour variation almost limitless.

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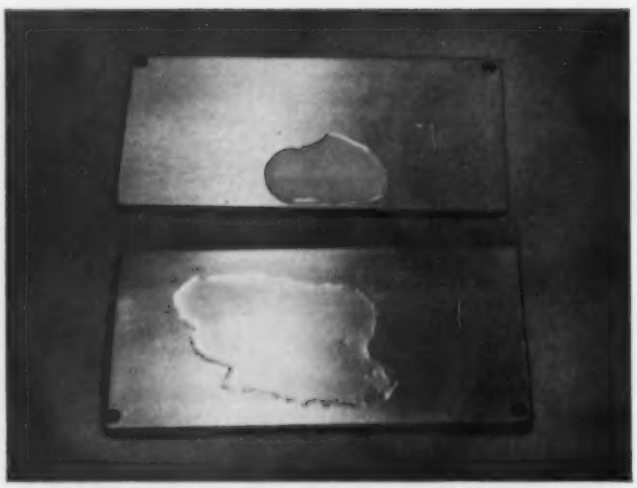

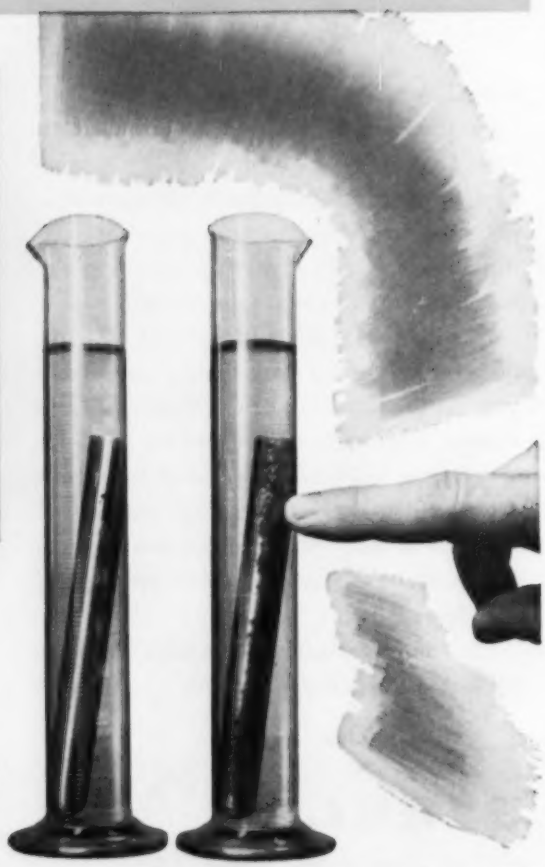

Above: Cooling action of a cutting fluid is directly related to its wetting ability. Conventional soluble oil emulsion (background) "balls" up. Equal amount of Shell Dromus Oil E spreads out thinly . . . wets far greater area.

Right: Plain carbon steel, if left in water at room temperature for about two hours, will rust as shown. Sample on left was in a 1-30 solution of Shell Dromus Oil E and water *for six months without rusting.*

SHELL DROMUS OIL E

NEW CUTTING OIL

permits higher speeds and faster feeds than ever maintained before

Shell Dromus Oil E, a new solution-type fluid, wets all metal surfaces with extreme rapidity and keeps both work and tools exceptionally cool. These qualities permit an increase of machine speeds and/or feeds far beyond anything allowable with conventional soluble oils.

IT'S MUCH EASIER ON TOOLS

There's much more life in any cutter or abrasive wheel when protected by this new oil. *It stays put* between tool and work. (At a 1-30 dilution, average tool life increase in extended field tests was about 50%.)

IT FIGHTS RUST

Shell Dromus Oil E is readily soluble in hot, cold, soft or hard water, and stable in any concentration. Even at low concentrations, it gives excellent rust protection to all ferrous metals, *including cast iron.*

IT KEEPS WORK COOL

Even at stepped-up production rates, you'll find less heating and better finish wherever this new oil is used.

IT SETTLES OUT FAST

Chips and wheel particles settle out immediately . . . the recirculated fluid is clean and free from contaminating particles. It is *not* sticky or greasy . . . leaves no deposits on machines or work.

IT'S GREAT FOR GRINDING

Grinding wheels remain clean, *even when material retains a film of cutting oil from a previous operation.* Even cast iron can be ground cleanly when Shell Dromus Oil E is used to cool the work.

If all this reads "too good to be true," we suggest that you try Shell Dromus Oil E *on any problem operation you have.* It *is* that good!

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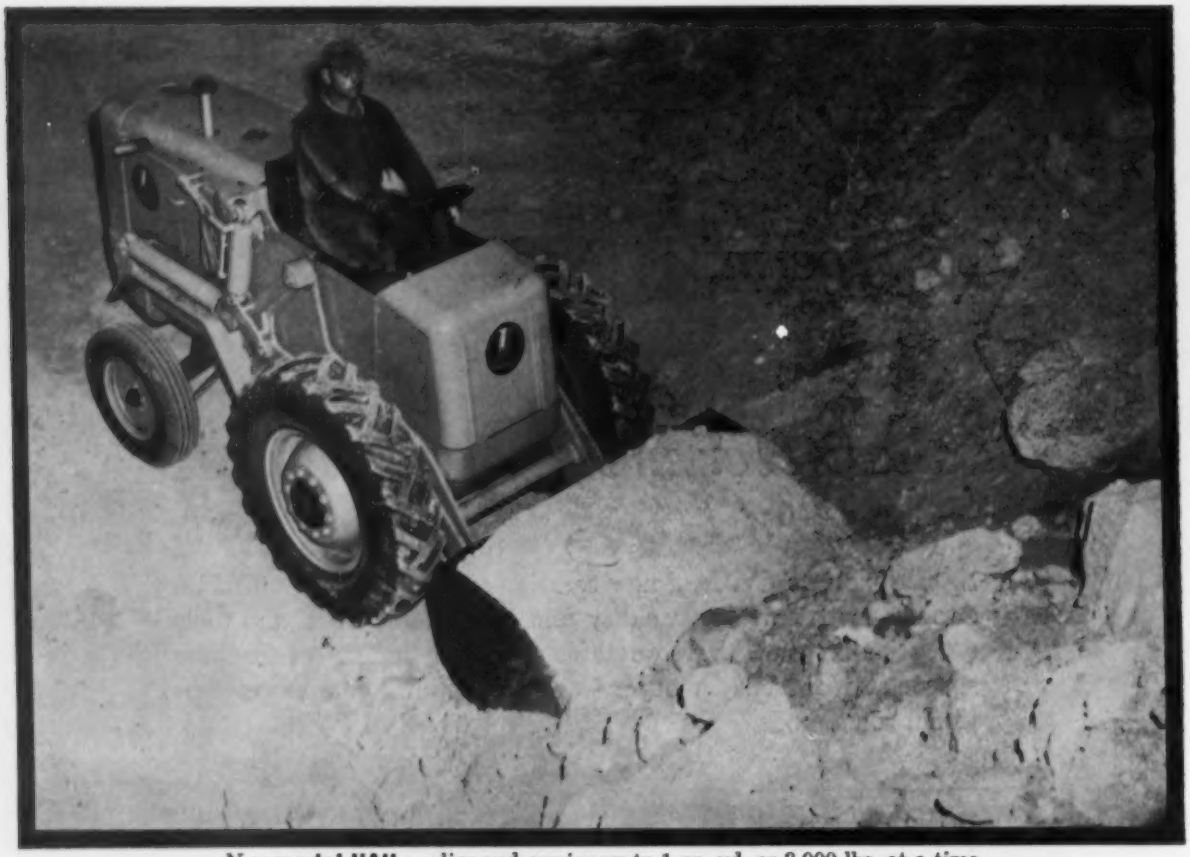
SHELL



New **model HAH** — digs and carries up to 1 cu. yd. or 3,000 lbs. at a time.

BOTH NEW and

DIGGING POWER

3,000 lbs. and 4,500 lbs. of tractive thrust, plus powerful upward rotation of bucket by twin hydraulic rams, develop tremendous digging power.

40° BUCKET TIP-BACK

Bucket tips back 40° on its hinges before it is even lifted — to get heaped bucket-loads quickly and prevent loss due to spillage.

CARRYING CAPACITY

40° tip-back also brings loaded bucket back close to machine *and low* for safe, fast transport.

SAFETY-STABILITY

Bucket arms and other moving parts are mounted and positioned low where they are no hazard to operator's limbs.

New **model HA** — digs and carries up to 18 cu. ft. or 2,000 lbs. at a time.

More Productive

Hough, the pioneer and leader in the tractor-shovel industry, is pleased to present these all-new "PAYLOADER" units. Both have front-wheel-drive and rear-wheel-steer — especially designed for stockpile work and fast material moving in close quarters. They give you a choice of sizes to best fit your requirements — they're the finest of their type in Hough history — they're both way ahead of the field in design, performance and all-round value.

Your Hough Distributor is eager to show what these new machines can do for you. The Frank G. Hough Co., 733 Sunnyside Ave., Libertyville, Ill.

OTHER FEATURES of these outstanding new models include: torque converter drive; full-reversing transmissions; closed, pressure-controlled hydraulic system; large hydraulic brakes; accumulator in hydraulic system that prevents pressure shocks and facilitates bucket control.

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THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
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Send data on "PAYLOADER" units
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1105 WIRE is the strongest and toughest rope wire that has ever been developed.

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Buhr ECONOMATION

Mills, core-drills, drills, countersinks and individual-lead-screw taps 206 intake manifolds an hour gross!

Economy and auto*mation* are combined in this Special to form another example of the way Buhr *Economation* reduces production costs for leading manufacturers.

This 6-way dial-type hydraulic-feed Buhr Special is equipped with a 72″-diameter 8-position automatic index table, complete with shot bolt.

Chip disposal is accomplished by an automatic rotating chip conveyor, attached to index.

Operations formerly accomplished by eight machines were combined in this Buhr Special —and volume of production was increased! . . . A typical example of Buhr Economation!

Buhr
MULTIPLE-SPINDLE
HIGH PRODUCTION MACHINERY

See what Buhr Economation can do to reduce your production costs. A phone call, wire or letter will bring you a prompt consultation with one of our top sales executives.

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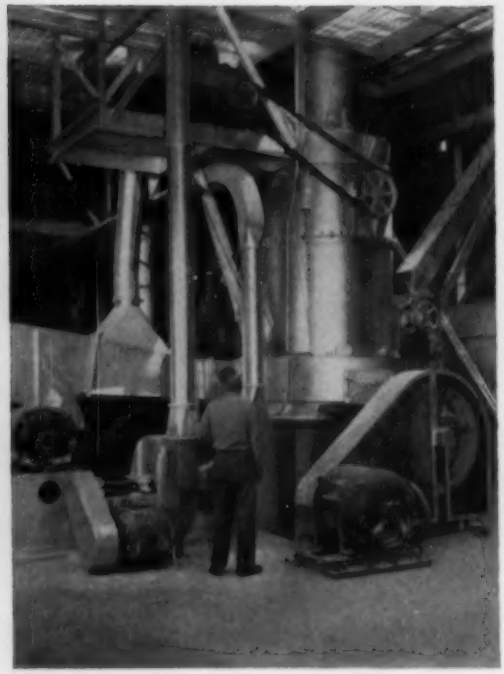

• *Big pulverizing mills made by Raymond Division, Combustion Engineering, Inc., depend on Johnson Bronze Bearings for trouble-free performance the world over. At right is a high side roller mill installed in the Kaiser Gypsum Wallboard Plant at Seattle.*

Where One Bearing Can Keep Whole Plant From Shutdown

When you're investing up to $85,000 for a pulverizing mill around which you're going to build an entire plant, you expect to get equipment which will give long, trouble-free performance.

One leading company in the field of designing and manufacturing pulverizing mills for use all over the world makes every effort to do just that—build sturdy equipment of the best available materials which won't break down because of the failure of any one part.

Because bearings play such an essential role in the operation of pulverizing mills, the Raymond Division, Combustion Engineering, Inc., has relied for more than 30 years on cast bronze bearings made by the Johnson Bronze Company of New Castle, Pa.

Johnson Bronze bearings rate high with this Chicago manufacturer because they can be depended upon to keep these expensive units on the job day in and day out and because they are made just the way Raymond Division specifies. That means a very low rejection rate and faster production.

Take the big bronze bearings Johnson makes for journals on a pulverizing mill. They are made to a tolerance of .002 of an inch. Because Johnson consistently meets this specification, the time required to fit the bearing is held to a minimum. A few taps with a rawhide mallet usually slips the bearing into its position.

If your product demands uniformity, investigate Johnson Bronze products. You can depend on them for faster production and longer life in use. Skilled engineers are available to help you decide what type of bearing you need to get the best possible results at lowest cost. Johnson Bronze Company, 505 S. Mill Street, New Castle, Pa.

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Furnace additions of **ELECTROMET** *silicomanganese give you many advantages . . .*

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• **Fast Solubility**—Because of the concentration of active elements in ELECTROMET silicomanganese, less time is required for solution in molten steel than when equivalent amounts of silicon and manganese are added separately.

• **Savings in Furnace Time**—Because of the low carbon content of silicomanganese, the carbon in the bath need not be reduced so much as would otherwise be necessary. This results in a saving in furnace time.

• **Cleaner Steel**—Since silicomanganese has a low carbon content, it is not necessary to drive the carbon as low (or make the oxygen as high) as when standard ferromanganese is used. The final steel is, therefore, cleaner and has better working properties.

CHOICE OF THREE GRADES

You have a choice of three grades of ELECTROMET silicomanganese:

Max. 1.50% Carbon Grade	Manganese	65 to 68%
	Silicon	18 to 20%
Max. 2.00% Carbon Grade	Manganese	65 to 68%
	Silicon	15 to 17.50%
Max. 3.00% Carbon Grade	Manganese	65 to 68%
	Silicon	12 to 14.50%

"ELECTROMET" SERVICE IS AVAILABLE TO YOU

Our metallurgists will be glad to assist you in the application of ELECTROMET silicomanganese to your specific requirements.

For further information please get in touch with the nearest ELECTROMET office.

The term "Electromet" is a registered trade-mark of Union Carbide and Carbon Corporation.

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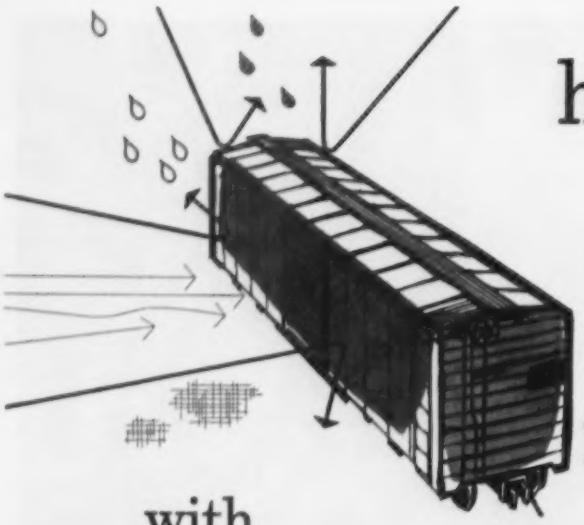

how to rust-proof a freight-car with FERRO-PAK®

by Cromwell

A leading wire manufacturer discovered this economical, easy way to use Cromwell Ferro-Pak VCI Paper to insure rust-free shipping of bright finished wire. Wire coils are shrouded with sheets of Ferro-Pak and the paper is used to line the sides of the car as well. Chemical vapors travel outward from both sides of the paper, forming an invisible protective film around the wire that doesn't give rust a chance to get a foothold. Non-toxic Ferro-Pak vapors are effective almost indefinitely under most conditions.

Think how this clean, fast, easy rust preventive method can save you money! No more dipping, slushing, scraping, wiping. No more costly extra packaging. To protect any ferrous metal product, you simply wrap it and it's rust-proofed—unwrap it and it's ready to use. Ferro-Pak comes in rolls, sheets, bags, envelopes, liners and covers. And we combine it with many other materials for a wide range of special uses.

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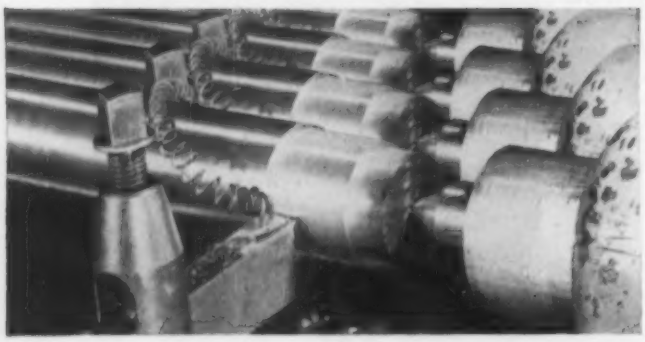
Every bar machines the same



FROM BAR TO BAR, from heat to heat, from order to order, the high quality of Timken alloy steel machining bars is uniform. Timken steel bars machine fast, easily, and with a good surface. Scrap loss is reduced, machining time saved. The quality of your finished product never varies.

Our Technical Staff will be glad to recommend the correct analysis for your machining bar requirements. Write The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

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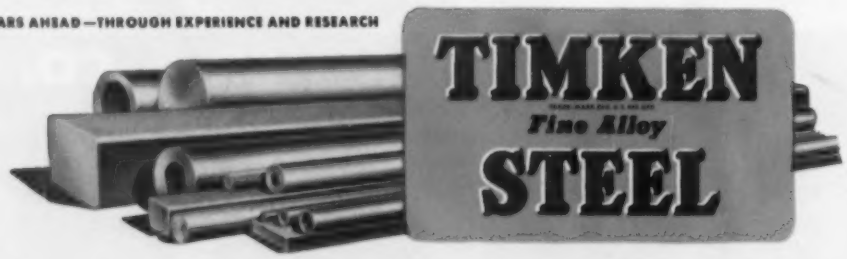
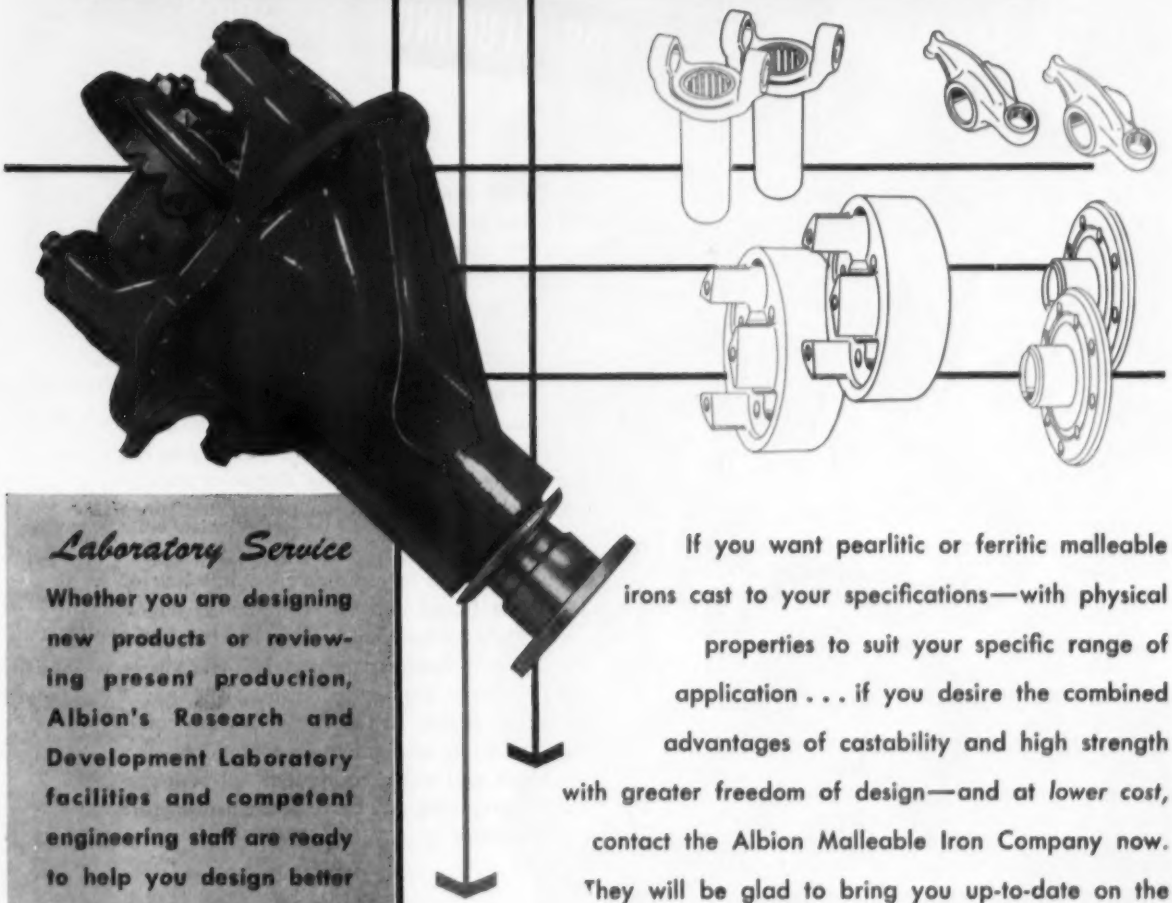


SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING

If you want to be certain



Laboratory Service

Whether you are designing new products or reviewing present production, Albion's Research and Development Laboratory facilities and competent engineering staff are ready to help you design better products that can be made at lower cost.

If you want pearlitic or ferritic malleable irons cast to your specifications—with physical properties to suit your specific range of application . . . if you desire the combined advantages of castability and high strength with greater freedom of design—and at *lower cost*, contact the Albion Malleable Iron Company now. They will be glad to bring you up-to-date on the rapid development in Albion's modern casting techniques which offer engineering advantages that are yours—*if you want to be certain.*

Remember . . . there is no engineering substitute for good, accurate, dependable castings!

ALBION MALLEABLE IRON CO.
ALBION, MICHIGAN

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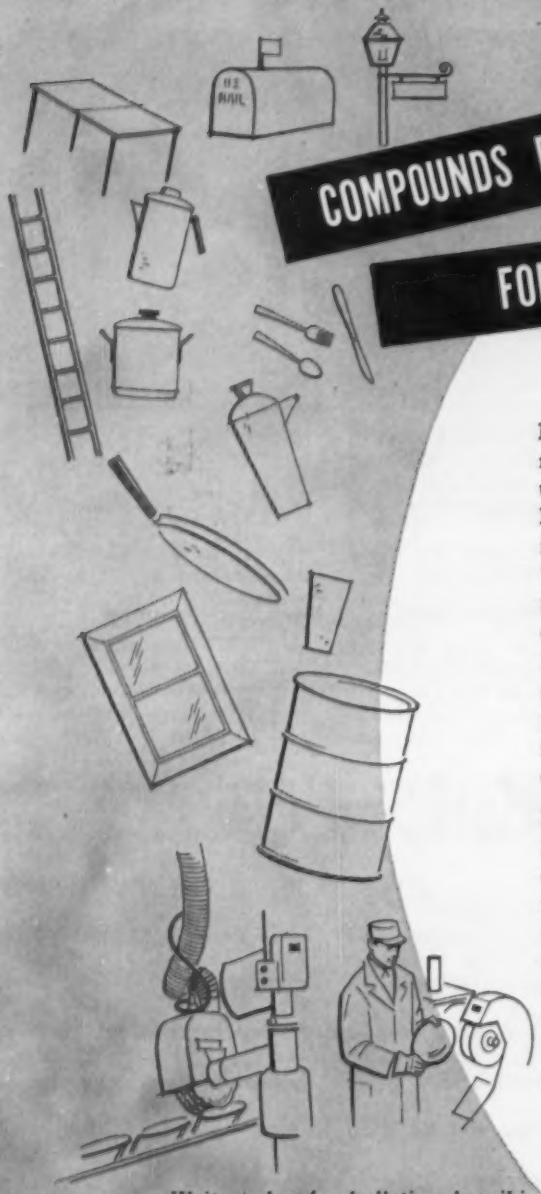
COMPOUNDS DESIGNED EXCLUSIVELY FOR ALUMINUM FINISHING!



H-VW-M long ago anticipated today's tremendous popular demand for aluminum products—by developing special compounds like Liquimatic 728 to suit the unusual characteristics of this soft metal. Heavy-duty Liquimatic 728 is formulated *expressly* for aluminum finishing. It's a true double duty compound, combining special cutting qualities with excellent coloring properties. And it works so clean, and cleans so easily that it's especially suited for buffing before anodizing. For color anodizing, too, it brings out deeper, richer tones every time.

Liquimatic 728 is just one of a full line of H-VW-M liquid and bar compounds developed solely for use in aluminum finishing. And it's not only compounds that H-VW-M supplies to make aluminum finishing easier . . . faster . . . *better.* In the H-VW-M line you'll find anodizing equipment—automatic buffing machines and other equipment—all types of buffs—everything you need, in fact, from start . . . *to finish!*

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DETROIT SELECTAFLOW CONTROLS

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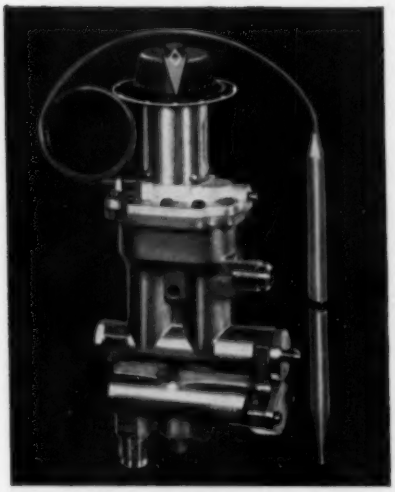

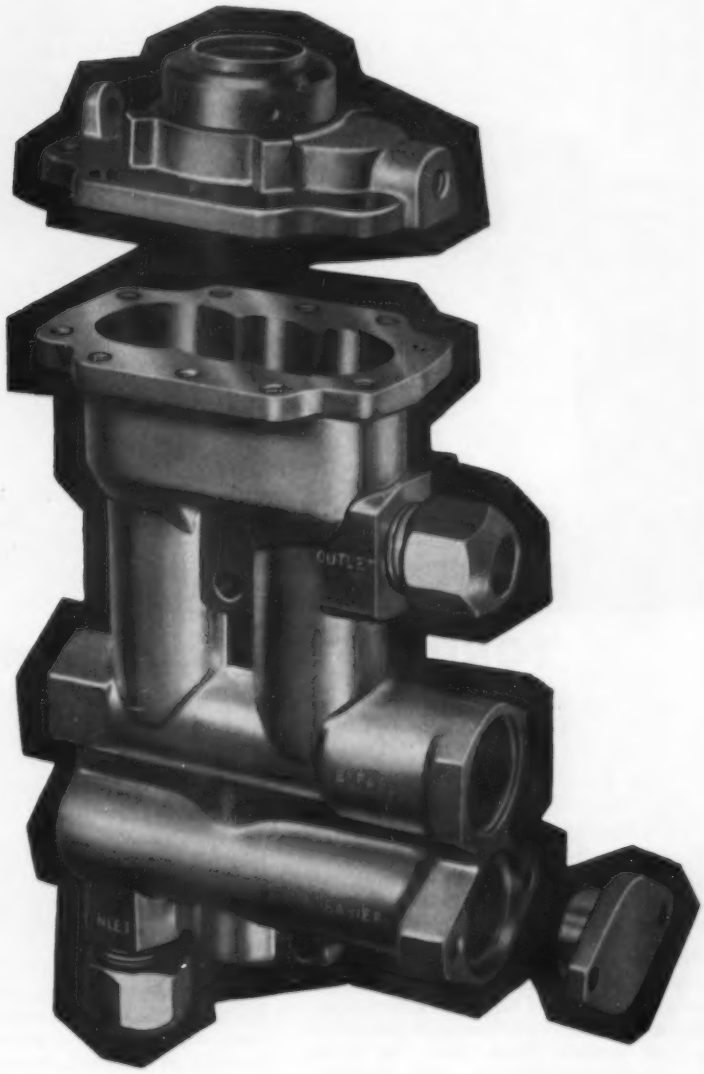

One of the finest thermostat control mechanisms for year-around air-conditioning systems is the automatic SELECTAFLOW, a product of the Detroit Controls Corporation. To maintain the high quality of this efficient unit and at the same time speed up and simplify assembly, the body, bonnet and side cover are being forged and completely machined to close tolerances by the Mueller Brass Co. In all, thirty-four machining and finishing operations are performed. This is but one more example of how Mueller Brass Co. machined forgings have improved a product and speeded production. With a wide range of copper-base alloys for forgings, a tremendous background of product engineering, and facilities for precision finish machining, the Mueller Brass Co. can supply machined brass or bronze forgings to *your exact specifications*. It will pay you to consider Mueller Brass Co. forgings for your new or redesigned products. Write us for full color catalog and technical information.

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TORRINGTON *Spherical Roller Bearings are used in every kind of heavy duty application requiring high load capacity, resistance to shock and wear under conditions of misalignment.*

TORRINGTON Spherical Roller Bearings

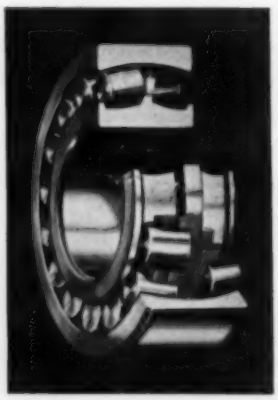
are manufactured with accurate geometrical conformity between races and rollers for ultimate capacity and performance.

Because conformity factors are uniformly high, rollers can operate with a minimum of friction and carry greater loads for a longer time.

There are other good reasons why TORRINGTON SPHERICAL ROLLER BEARINGS can guarantee superior performance. Races and rollers are precision ground to a high surface finish from the finest quality electric furnace steel available.

An integral center flange on the inner raceway gives positive radial and thrust stability against continuous high-speed, high-load conditions. Fully machined, cast-bronze, land-riding cages—one for each path of rollers—allow thorough lubrication, reduce wear and lengthen bearing life.

Specify dependable, rugged TORRINGTON SPHERICAL ROLLER BEARINGS in your equipment. They're available with either straight or tapered bore for shaft or adapter mounting.



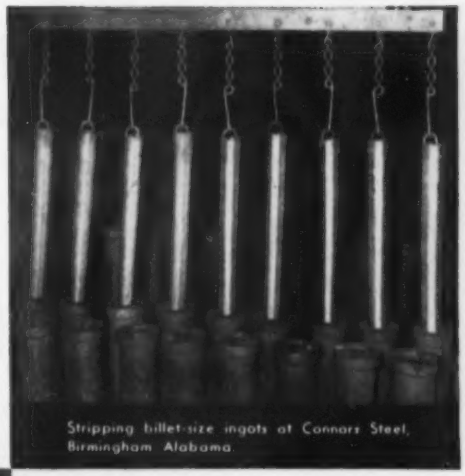
THE TORRINGTON COMPANY
South Bend 21, Ind. • Torrington, Conn.

District Offices and Distributors in Principal Cities of United States and Canada

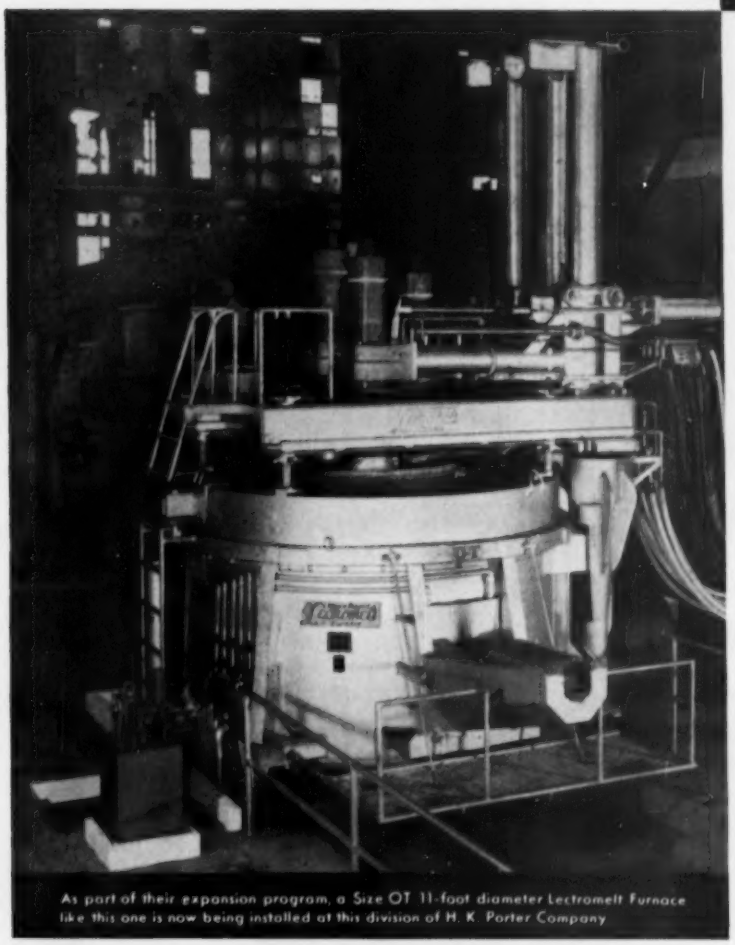
TORRINGTON SPHERICAL ROLLER BEARINGS

Spherical Roller • Tapered Roller • Cylindrical Roller • Needle • Ball • Needle Rollers

Success in producing billet-size ingots with their Lectromelt* Furnaces causes Connors Steel to add another



Stripping billet-size ingots at Connors Steel, Birmingham Alabama



As part of their expansion program, a Size OT 11-foot diameter Lectromelt Furnace like this one is now being installed at this division of H. K. Porter Company

● "We've bought a fourth Lectromelt Furnace because we're 100% satisfied with our three previous Lectromelts", reports Mr. J. B. Reeves, Works Manager for Connors Steel Division, H. K. Porter Co., Inc. of Pittsburgh, Pa. "We cast 4" to 8" billet-size ingots, thereby by-passing any need for soaking pits and a blooming mill."

Billet-size ingots solidify rapidly, resulting in uniformity and fine grain structure. Merchant shapes and reinforcing bars are produced from them now at Connors Steel, with cold finished bars to be added early in 1956.

Lectromelt Furnaces used generally on billet-size ingot work vary widely in capacity, ranging from units making heats of 500 pounds up to 15-ton heats. Of course, other Lectromelt Furnaces in capacities up to 150 tons are regularly used for producing heavy ingots.

Catalog No. 9-A describes Lectromelt Furnaces for all metal melting and refining work. For a free copy, write Pittsburgh Lectromelt Furnace Corporation, 312 32nd Street, Pittsburgh 30, Pennsylvania.

Manufactured in...GERMANY: Friedrich Kocks GMBH, Dusseldorf...ENGLAND: Birlec, Ltd., Birmingham ...FRANCE: Stein et Roubaix, Paris...BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege...SPAIN: General Electrica Espanola, Bilbao...ITALY: Forni Stein, Genoa. JAPAN: Daido Steel Co., Ltd., Nagoya

*REG. T. M. U. S. PAT. OFF.

MOORE RAPID

WHEN YOU MELT... *Lectromelt*

ITEMS LIKE THESE AVAILABLE AT

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BRASS or COPPER
RIVETS and WASHERS

BRASS, COPPER, BRONZE
COTTER PINS

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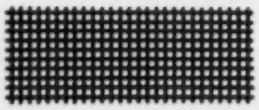
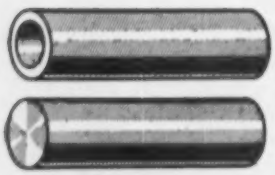


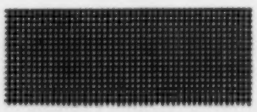
INDUSTRIAL WIRE CLOTH



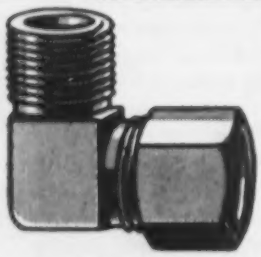
SOLID or CORED BEARING BRONZE

BRASS or BRONZE WOOD
and MACHINE SCREWS

BRASS ESCUTCHEON PINS



BRASS STRAINER CLOTH



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BOLTS and NUTS

CALL US FOR ANYTHING from Bearing Bronze Bars to Brass or Bronze Bolts...or other fastenings like those shown here for maintenance, repair, operating or production. Twenty-five Chase warehouses are located in major industrial centers from coast to coast. Phone the one nearest you. We can usually fill your orders from stock.

NEW! Chase's informative rod and wire movie: "IN THE CHIPS." Arrange for a free loan of this film by contacting the Chase warehouse or sales office near you. Write on your company letterhead, today!

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5 YEAR GUARANTEE on material and workmanship; write for details.

Cincinnati sheared blanks are accurate. Only accurate blanks insure accurate economical forming and low cost assembly.

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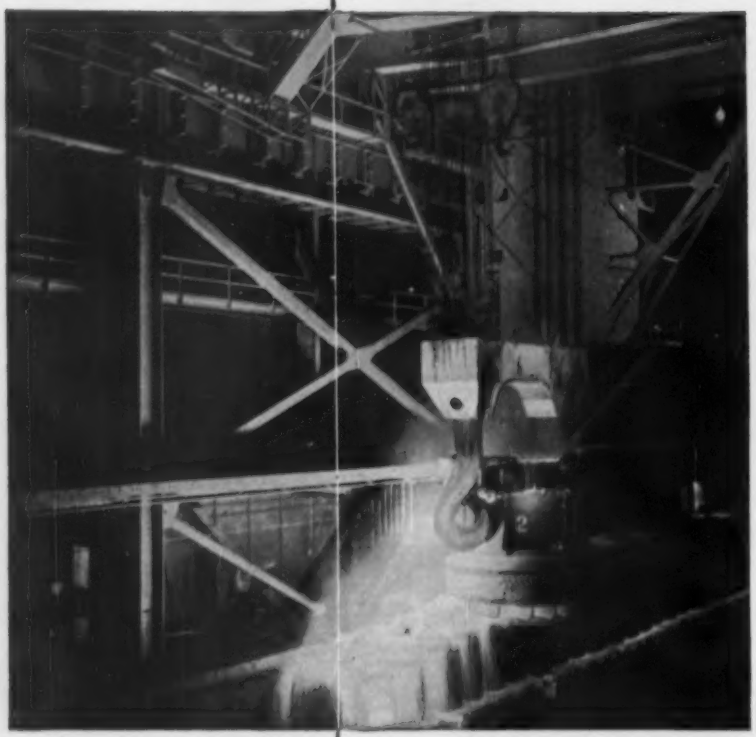
Morgan cranes stop "on a dime"

● BRAKING a Morgan crane under full load is as easy as stopping the family car.

Morgan hydraulic crane brakes provide maximum safety and pin-point accuracy in spotting heavy loads . . . another vital link in the chain of features that makes Morgan cranes best in the business.

Performance records prove that advanced design and heavy-duty construction of Morgan cranes make them less costly to operate and maintain. Let our representative show you how to save the most by buying the best . . . Morgan!



Positive action encourages operators to use the hydraulic brake rather than plug the motor.

The Morgan Engineering Company, founded in 1868, manufactures overhead electric traveling cranes, gantry cranes, charging machines, plate mills, blooming mills, structural mills, shears, saws, and auxiliary equipment.

THE MORGAN ENGINEERING CO. *Alliance, Ohio*

dependable!

WEIRTON

high carbon strip cold-rolled spring steel

for high-speed blanking or forming

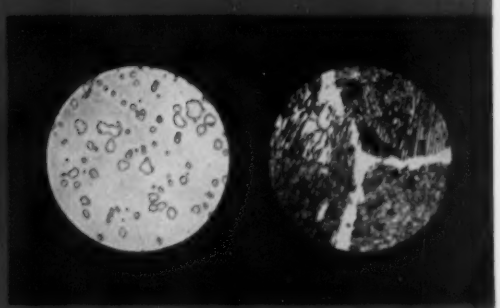
Where high fatigue-resistance is a principal factor, Weirton cold-rolled spring steel furnishes high carbon strip in the consistent uniformity necessary to meet the most exacting requirements of a wide variety of products. The close manufacturing control featured at Weirton results in several unique and highly desirable qualities—such as accurate response to heat treatment . . . uniformity of gauge and width . . . uniform chemical and physical properties . . . exact consistency of grain structure . . . controlled decarburization limits.

Pearlitic and spheroidized structures are available with desired chemical analyses and for specific heat treating and hardness. When you call Weirton you call for easier blanking and cold forming. And, at Weirton, you get what you call for.

WEIRTON STEEL COMPANY

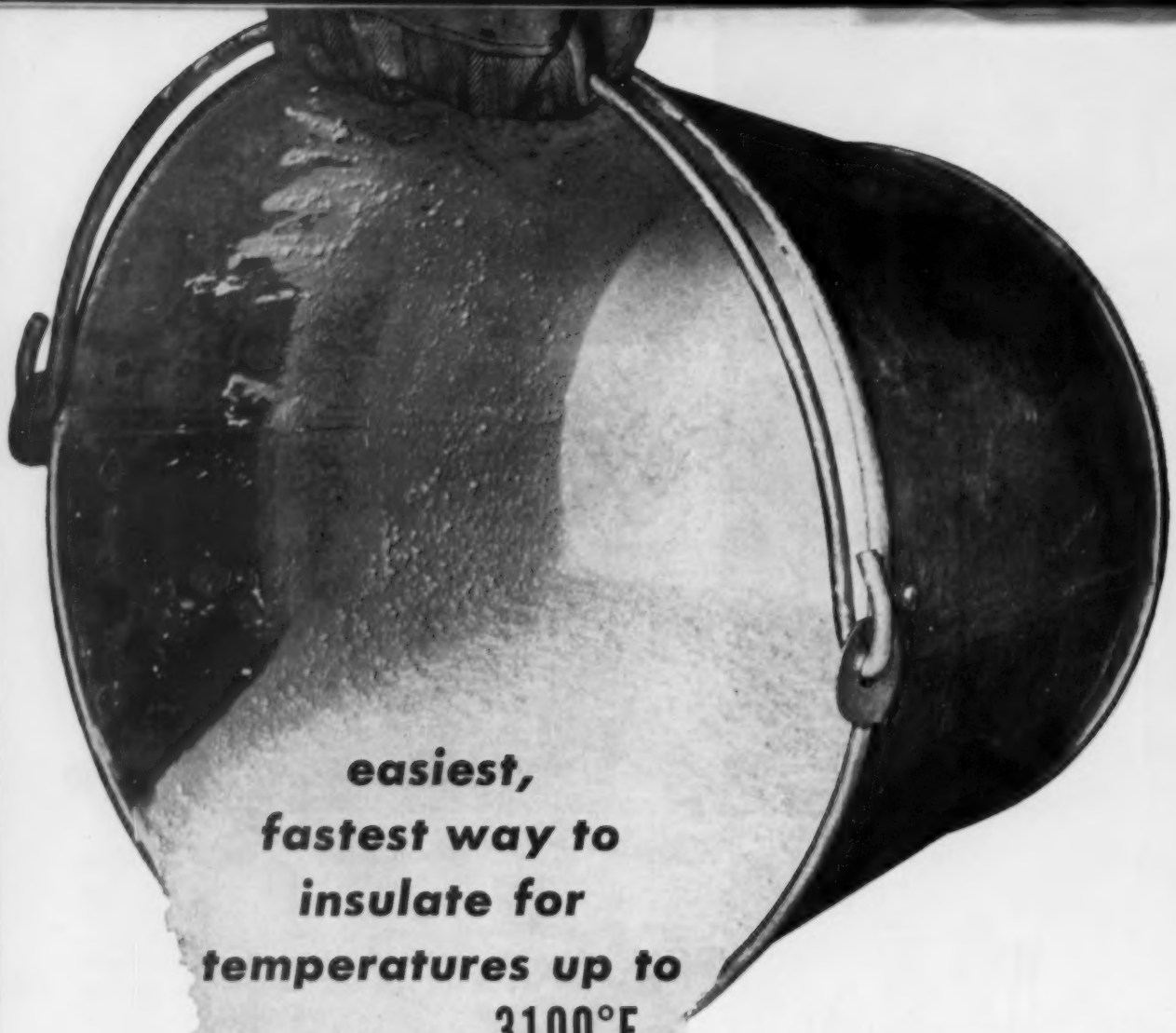
Weirton, West Virginia

NATIONAL STEEL CORPORATION

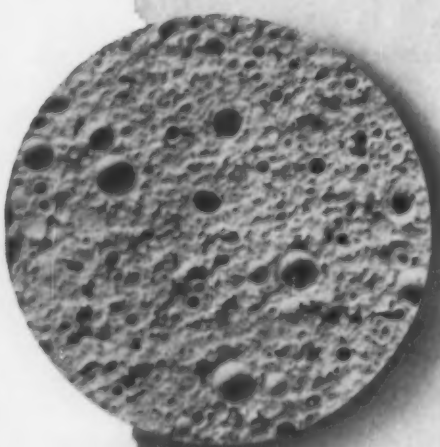


The photomicrograph on the left illustrates Weirton high carbon strip that has been spheroidized and annealed—soft and ductile—ideal for cold-forming operations. The one on the right shows the pearlitic steel structure, temper-rolled in controlled hardness and strength for clean, economical blanking procedure.

WEIRTON STEEL COMPANY



easiest, fastest way to insulate for temperatures up to 3100°F



Here's why ALFRAX cement insulates so well: A sliced-through section of set cement reveals the secret: dead air space in the thousands of closely-packed bubbles of alumina.

CARBORUNDUM
Registered Trade Mark

ALFRAX® castable aluminum oxide cements are just about the most effective insulating materials you can find for temperatures up to 3100°F—and especially so at the upper end of the temperature range. They consist of tiny bubbles of pure alumina held together by a bonding agent.

These castables make ideal back-up linings for nonferrous crucible furnaces and for the sidewalls of reverberatory furnaces. Or you can cast them into burner blocks for core ovens and malleable annealing furnaces. Aluminum oxide is one of the most stable and inert of all materials . . . is highly resistant to practically all furnace conditions. And to use, all you do is mix it with water and pour.

So, if you're looking for a castable insulating material to stand really high operating temperatures . . . and keep on standing them through a long, useful life . . . you can end your search right now by writing us for free engineering information on these highly refractory, low heat capacity, easy-to-use cements. Address Refractories Division, The Carborundum Company, Perth Amboy, N. J., Department B115.

use 'dag' dry films for trouble-free lubrication

Treat your steel forging dies with 'dag' Colloidal Graphite and increase the number of acceptable forgings per die by as much as 100 percent. The *dry lubricating film* formed by colloidal graphite protects both dies and forgings. Freedom from scaling and sticking often eliminates some of the usual finishing operations on forgings, and greatly extends die life.

'dag' Colloidal Graphite is much more effective than ordinary high-temperature lubricants, including the best of powdered graphite. It is high-purity, electric-furnace graphite, specially treated by Acheson to produce microscopically fine particles. Dispersed in many fluid carriers for convenient application, 'dag' Colloidal Graphite will not burn, flake, or gum, at temperatures commonly encountered in metalworking operations.

'dag' dispersions are used profitably in stamping, deep-drawing, piercing, casting, forging, stretch-forming, and wire drawing. You'll find a surprising number of ways to use 'dag' dispersions described in our free booklet on 'dag' Colloidal Graphite for Metalworking Operations. Write for Bulletin No. 426-P2.

You can double the service life of steel forging dies

Dispersions of molybdenum disulfide are available in various carriers. We are also equipped to do custom dispersing of solids in a wide variety of carriers.

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PORT HURON, MICHIGAN

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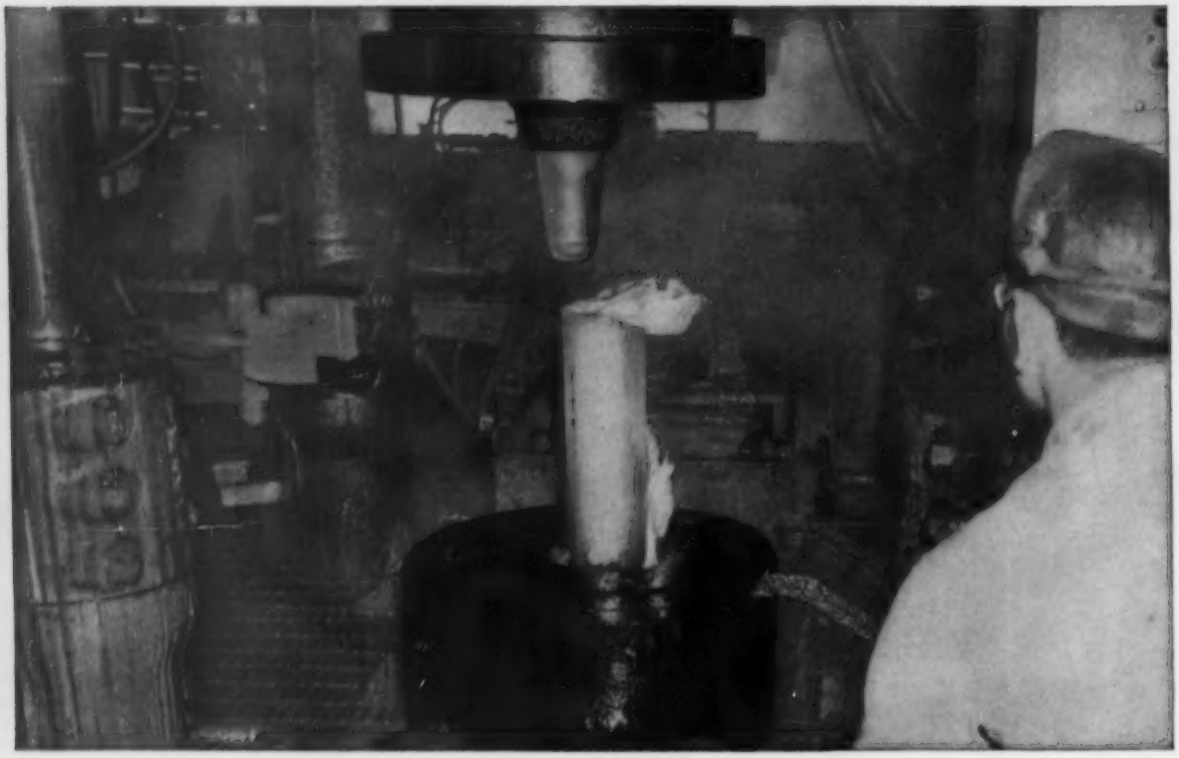

Die Pot Life Increased 350 Per Cent

A deposit of HASTELLOY alloy C hard-facing rod has more than tripled the service life of the die pots used in this slugging and piercing operation. The hard-faced parts are exposed to severe impact and abrasion at high temperatures. Press tonnages required to perform the operation have been reduced from 30 to 50 per cent since the pots have been faced with HASTELLOY alloy C. This rather unusual plus value is due to the low friction characteristics of this nickel-base alloy.

Resists Chipping and Spalling

HASTELLOY alloy C is a tough, machinable, hard-facing alloy that can be applied to all common die steels. It has high tensile strength, good ductility and excellent resistance to chipping and spalling. It can be applied by the metallic-arc process, flows smoothly, and produces sound deposits. No special heat-treating or cooling procedures are needed.

No Grinding or Peening

When deposited, HASTELLOY alloy C has a hardness of 210 Brinell, and can be machined easily by ordinary die-sinking tools. Then the deposit work hardens, in service, to about 375 Brinell without deformation. Its work-hardening characteristics eliminate the necessity for peening the deposit to obtain maximum wear-resistance.

For information on procedures for applying and for available sizes and prices, write for the booklet "HASTELLOY Alloy C—A Machinable Hard-Facing Alloy."

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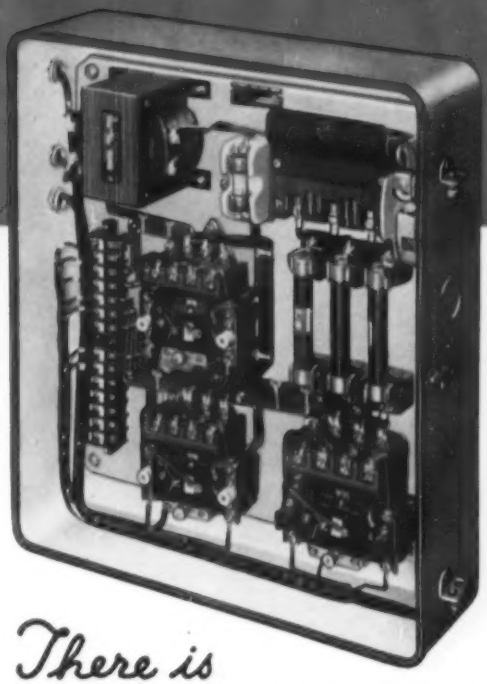
Oakes mixing machine for continuous mixing of raw materials in the rubber and chemical industries.

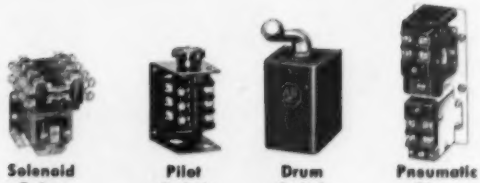
The Sign of QUALITY MOTOR CONTROL



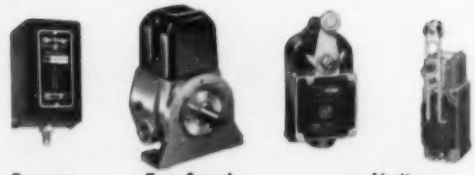
Close-up of Allen-Bradley automatic motor control panel.

Service-tested Components for Automation Control Panels

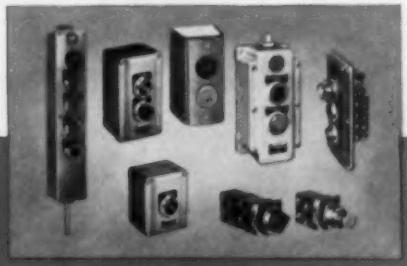
Reversing Switch — Solenoid Starter — Multispeed Starter



Solenoid Relay — Pilot Switch — Drum Switch — Pneumatic Timer



Pressure Switch — Zero Speed Switch — Limit Switches



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There is SALES VALUE for YOU in the A-B TRADEMARK

Time has established the A-B trademark as the sign of Quality in motor controls. It is so recognized by the buyers of your motorized machines. So, why not standardize on Allen-Bradley controls.

Years and years of trouble free service in every conceivable industry has proved conclusively that A-B controls are a real sales asset to any machine. You just cannot beat Allen-Bradley controls for simplicity in design . . . your guarantee for reliable and consistent performance.

Whether you need a single starter or an all-inclusive special control panel, call in your nearest Allen-Bradley sales engineer. Let him recommend the components that will assure the most continuous output from your machines.

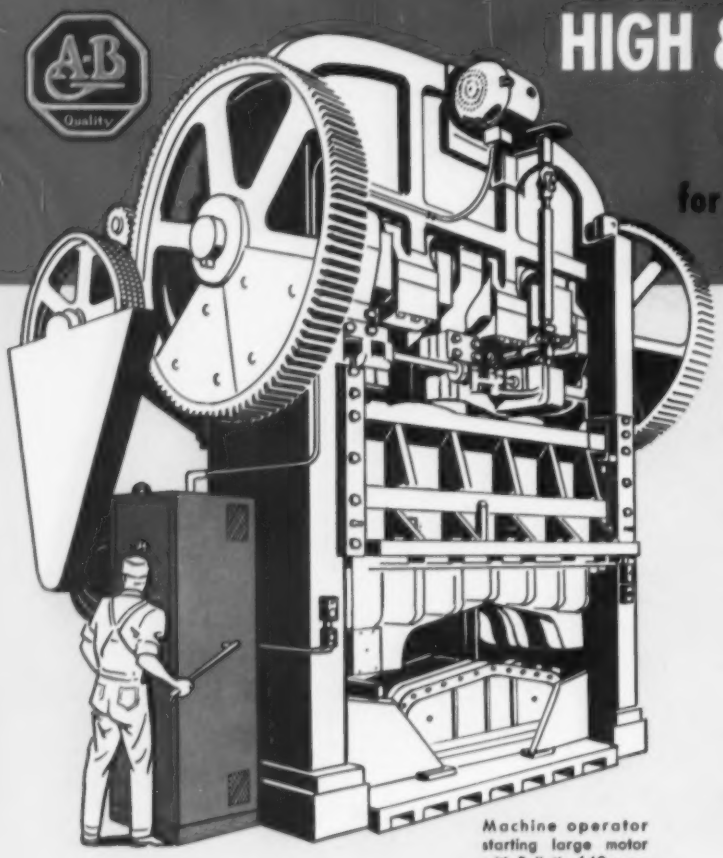
Allen-Bradley Co., 1316 S. Second St.
Milwaukee 4, Wisconsin

In Canada—Allen-Bradley Canada Ltd.
Galt, Ont.

ALLEN-BRADLEY
SOLENOID MOTOR CONTROL
QUALITY

9-55-MB

HIGH & LOW VOLTAGE STARTERS for BIG MOTORS



Machine operator starting large motor with Bulletin 640 manual velvet smooth resistance starter. Starting jolts are eliminated.

BIG STARTERS for big motors . . . for 220-440-550 volts . . . for 2000 to 2500 volts . . . and for 2501 to 4600 volts . . . are catalog listed units in the Allen-Bradley line. Illustrated below is a limited variety of starters for squirrel cage, wound-rotor, and synchronous motors. Starters for manual or automatic operation are available. Starters for 600 volts or less are available in ratings up to 600 hp. High voltage starters are rated up to 1500 hp.

Write for a copy of the Allen-Bradley Handy Catalog in which all varieties of "big starters" are listed. It is also a handy buyer's guide on the latest developments in controls and accessories.

Allen-Bradley Co., 1316 S. Second St.
Milwaukee 4, Wisconsin

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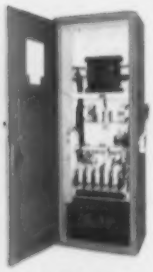
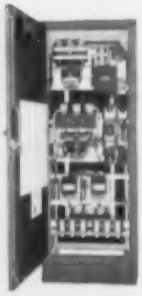
ALLEN-BRADLEY
SOLENOID MOTOR CONTROL
QUALITY

A FEW OF THE BIG STARTERS IN THE ALLEN-BRADLEY LINE



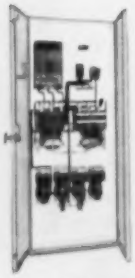
Bulletin 646 manual autotransformer type starter

Bulletin 740 automatic reduced voltage motor starter

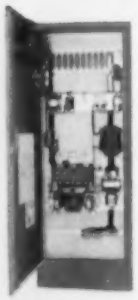


Bulletin 742 automatic starter—velvet smooth acceleration

Bulletin 746 automatic autotransformer type starter

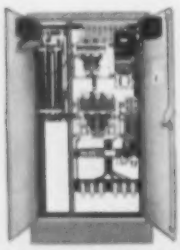


Bulletin 761 automatic wound-rotor motor starter

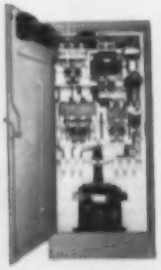


Bulletin 906 across-the-line synchronous motor starter

Bulletin 906 high voltage synchronous motor starter

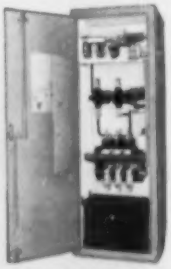


Bulletin 914 reduced voltage synchronous motor starter



Bulletin 922 low voltage synchronous motor starter

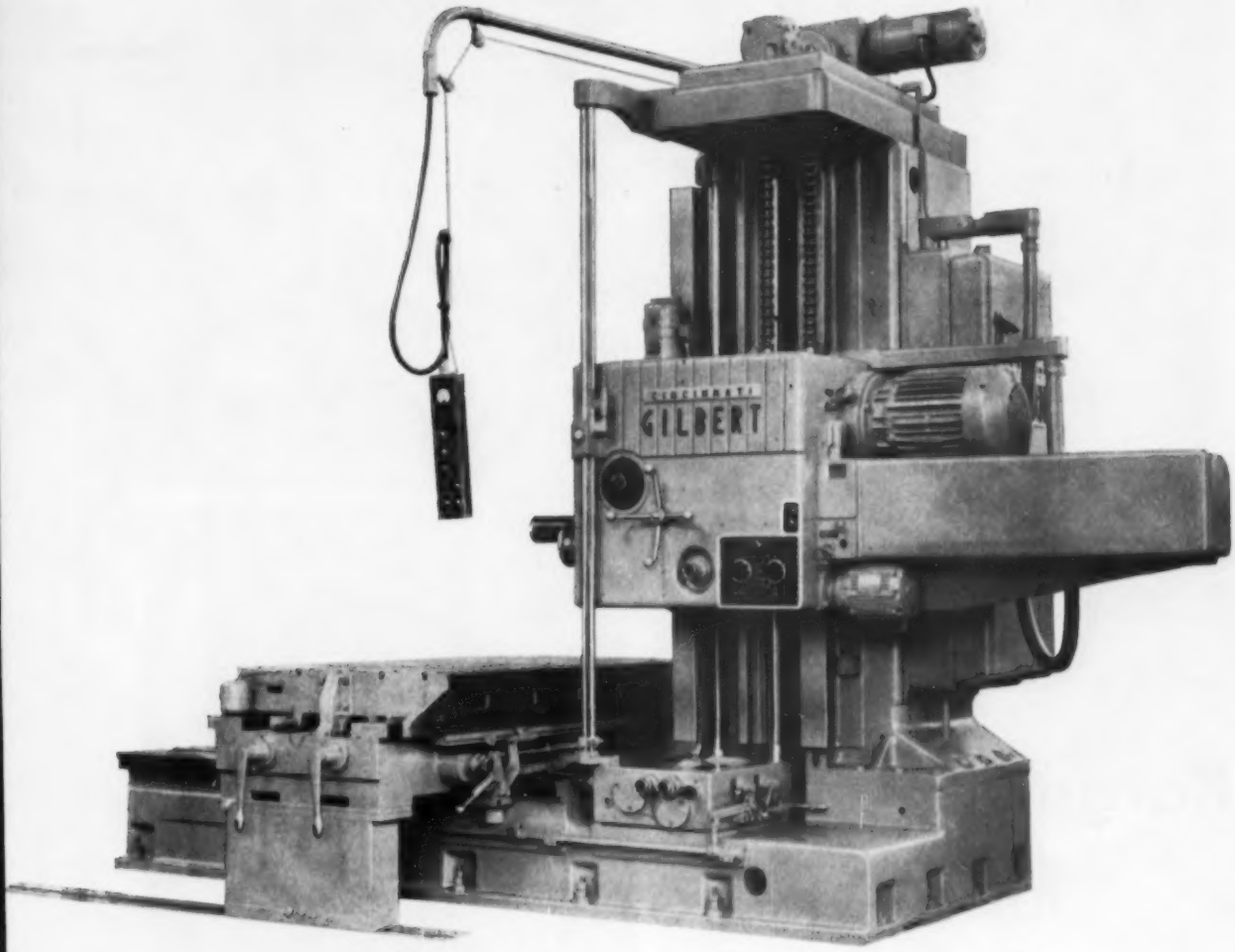
Bulletin 922 high voltage synchronous motor starter



Bulletin 1109 high voltage across-the-line starter

Bulletin 1146 high voltage squirrel-cage motor starter

9-55-MR



new horizontal pampering mill

Preset dial for
power automatic changing of speeds and feeds •
Pushbutton station,
always near operator, with:
Start, stop, reverse for spindle •
Control for spindle electric clutch and brake •
Reverse for all feeds •
Forward, reverse power rapid traverse •
Selection and control for spindle and
milling feeds and rapid traverse •
Separate control for
back gear clutch on spindle sleeve •
Selection of milling feeds to
head, table, and saddle •
Control of spindle feed electric clutch •
Power clamp to head; and
Automatic positioning if ordered •

softens operators, treasurers! A word of caution before you read about this all-new 4-4½" horizontal boring mill: it will probably spoil your operators and your company treasurer as well.

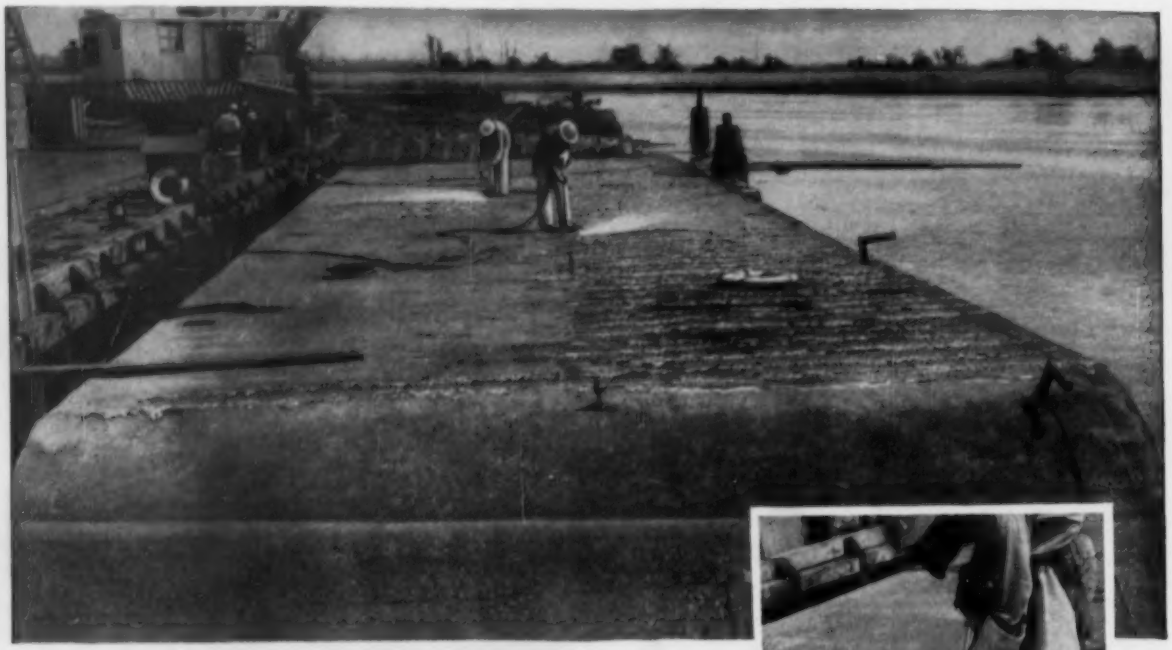
Every feature, new from the floor up, is designed to make the operator's job simple, fast, and accurate. He'll look as if he's loafing, but his floor-to-floor time will be faster than it's ever been before.

It's your company treasurer who'll require careful tactics. At first, he'll think you're a shrewd man with a dollar when you show Gilbert's proposal. But then he'll think *all* budget items should offer this many new features per dollar—and few will.

Ask for Bulletin 855 (Table Type) and Bulletin 955 (Floor Type).

The Cincinnati Gilbert Machine Tool Co.
3366 Beekman St., Cincinnati 23, Ohio

those who buy Gilbert buy **GILBERT** *again*



This C-51 deseaming blowpipe opens transverse plate welds in steel barge bottoms 7 times faster than the previously used process.

Barges get new lease on life...

FOR 70% LESS COST

Deseaming blowpipes have cut the time required to remove these steel barge bottoms from 4 days per barge, to only 1½—and cut costs $500 per barge....

In this operation, the barges were rolled over in the water. Bottom plates were deseamed and removed, and then new plates UNIONMELT welded in position. Before removing the old plates, it was necessary to "open" seam welds, plug welds, and rivets. The deseaming blowpipes did this work with maximum speed and economy—and with minimum nicking into the support members beneath the plates.

Deseaming blowpipes operate with a low-velocity oxygen stream, and make a wide pass in metal at high speeds. The depth of penetration is controlled by regulating oxygen pressure. Lightweight, easy to handle deseaming blowpipes are speeding production and repair operations throughout industry.

For more information on this or any other of LINDE's modern, money saving processes, call your local LINDE representative. Start saving now, call him today.

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Trade-Mark

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THE DIFFERENCE... *Carpenter* stainless uniformity

These hinge pivot pins for automatic dishwashers were being turned out by "doing things the hard way." Tools had to be reground every eight hours. The ordinary Type 303 steel used wasn't uniform, refused to hold size, and didn't provide the required finish.

This job could easily have been chalked up as a "necessary headache," but someone wasn't satisfied . . . was willing to explore the possibilities for improvement. As a result, Carpenter Stainless No. 8 (Type 303) has brought these worthwhile changes: Tool regrinding is required only every 18 to 24 hours . . . final grinding of the part is eliminated because size tolerances were held so accurately . . . bar after bar machines the same . . . and each part now costs 50% less.

Build your own improvement program with the cooperation of Carpenter . . . originator of the first Free-Machining Stainless. The steel can be in your plant almost immediately if you call your nearest Carpenter Mill-Branch Warehouse, Office or Distributor now. *The Carpenter Steel Co., 121 W. Bern St., Reading, Pa.*

Specify Carpenter...
the one stainless job-proved to give you:

easier machining
fewer rejects
smoother finishes
lower production costs

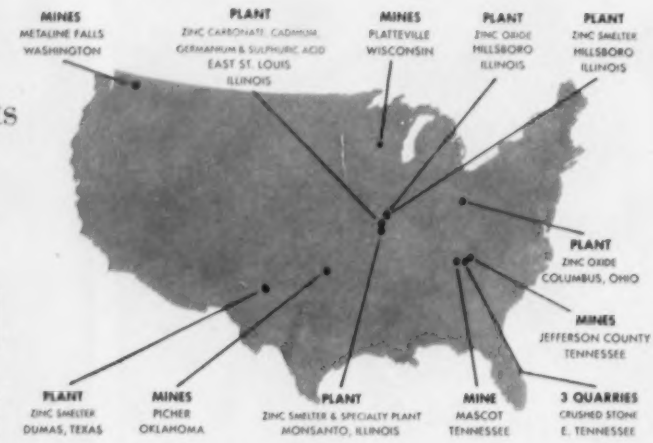
Carpenter STEEL

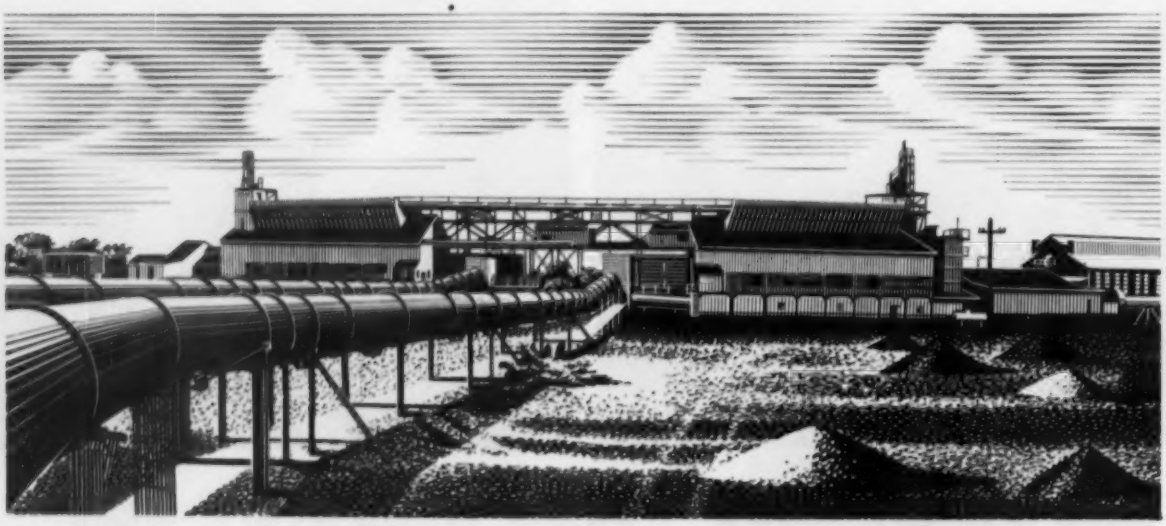
Free-Machining Stainless Steels

IMMEDIATE DELIVERY from local warehouse stocks — Export Address: Port Washington, N. Y. — "CARSTEELCO"

American Zinc and its products

from A *to* Z





DUAL OPERATION AT HILLSBORO, ILLINOIS

(1) The Oxide Division supplies American process lead-free and leaded zinc oxide, as well as French process zinc oxide. (2) In the Metal Division, Prime Western, Select, Brass Special, Intermediate and High Grade slab zinc are produced. For complete picture of American Zinc operations, see map above.

PRODUCERS OF

ALL GRADES OF SLAB ZINC
ZINC ANODES (Plating & Galvanic)
METALLIC CADMIUM
SULPHURIC ACID
LEAD-FREE and LEADED ZINC OXIDES
ZINC CARBONATE
GERMANIUM DIOXIDE
AGRICULTURAL LIMESTONE
CRUSHED STONE

Distributors for

American Zinc sales Company

AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, Ohio • Chicago • St. Louis • New York • Detroit • Pittsburgh

The Iron Age Newsfront

Promise of Sounder Ingots

A new, moldable exothermic material for hot top linings promises to produce a sounder ingot with much less feed metal in the hot top section. Capable of reducing hot top loss to a mere 1 to 3 pct of total ingot weight, the new liner material has worked successfully with tool steels, stainless and a variety of structural grades.

Talk of Replacing 'Tin' Can

Continuing research on the part of steel and can companies is reducing appreciably the thickness of tin coatings on containers. Research people are already talking about some container applications in the not too distant future in which tin will be completely replaced by other coating materials now under development. Aluminum and nickel have been mentioned as definite possibilities.

Switch To Copper For Building

The new Seagrams building about to be erected in New York City will feature extensive use of copper trim instead of steel or aluminum. Additional cost is justified, the company believes, because the building's unusual appearance is expected to pay off in publicity.

Fast Way to Measure Noise

Measurement of impact noises has long been a headache to industrial noise engineers. Recently, noise technicians whipped up a machine that measures impact noises comparatively. Moreover, it draws conclusions in about half a minute and can draw a graphic picture of a kerplunk—a bang—or even a thump.

Industry Gets Broadcast TV Units

Builders of TV equipment aren't anxious to talk about broadcast-type television units for inplant use, but U. S. industry is now buying them. Up to the present, plants depended on closed circuit systems to monitor production processes. The cost per installation will be considerably higher since it means the purchase of all basic equipment needed for commercial broadcasting. As an added note on TV development, an industrial type camera capable of transmitting still pictures over a standard telephone line, rather than a coaxial cable, will be announced officially in the next few weeks.

High Efficiency For Torque Amplifiers

Combined use of a torque amplifier unit with conventional gears has, in some cases, given higher efficiency for transmission of power at slow speeds. In one instance, the increase went from 50 to 90 pct. The data will probably increase interest among gear people who are searching for new markets.

Big, New Market For Platinum

High-priced platinum will soon have a major market in some of the newer U. S. petroleum refineries. The metal comes into play in the production of high octane gas. However, it is recoverable. One new unit in the Midwest will use about 3000 oz—at about $100 per oz. The bulk of it comes from Russia with only a token output in the U. S.

Ford Expansion To Start Soon

Construction will begin soon on Ford's new parts plant in Ypsilanti, Mich. The plant, scheduled to produce instrument clusters and carburetors, will replace existing facilities at Manchester and Milford, Mich. The 600,000 sq ft structure is expected to be completed by 1957, but partial production will begin by late 1956.

Helicopters Getting Bigger

Seven Sikorsky helicopters just ordered by New York Airways, Inc., will boost passenger capacity from five to twelve per flight. This first commercial use of the larger craft is looked upon as a step toward lower fares.

MIDVALE FORGES STAINLESS STEEL

Official U.S. Navy Photograph

To Harness Atomic Power Underseas

In planning atomic-powered submarines, top-grade materials and top-quality workmanship were first considerations throughout.

Midvale is proud to have supplied the stainless steel forgings used in the heat exchanger system of the power reactor . . . proud because of the recognition thus given to Midvale quality . . . in steel making, in forging, and subsequent heat treatment, inspection and testing.

These forgings of type 347 stainless steel required the most careful control in the melting and casting of the ingots, together with the best in forging technique to produce material that would pass all of the exacting metallurgical requirements. The 100% Zyglo inspection, inside and out, was only part of the specifications. All forgings were fabricated by welding into the piping system and heat exchanger.

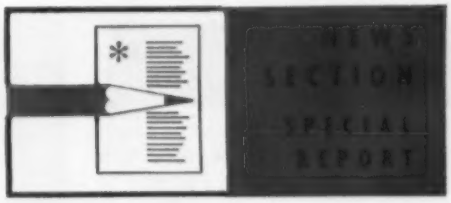
It will pay you, too, to call Midvale for any forging . . . carbon, alloy or stainless steel . . . any shape — rolls, gear rings, shafts, pressure vessels or a variety of other steel products.

THE MIDVALE COMPANY- Nicetown, Philadelphia 40, Pa.

Offices: New York, Chicago, Pittsburgh, Washington, Cleveland, San Francisco

MIDVALE

FORGINGS, ROLLS, RINGS, FLANGES, CORROSION AND HEAT RESISTING CASTINGS



Have You Looked Into Industrial TV?

TV cameras are saving money, performing important jobs for industry . . . Applications range from plant guard duty to quality control . . . Big sales boost is predicted for 1956—By K. W. Bennett.

INDUSTRIAL TELEVISION

◆ INDUSTRIAL television is picking up riders like the proverbial bandwagon and looks just as pretty. After eight quiet years, television for in-plant use spread its wings four months ago—the first hint of the height to which this industrial tool will climb.

Metalworking will be a major customer. Small, industry-owned TV cameras already are peering into openhearths, heat-treat furnaces, foundry cupolas; are studying freight yards, inspecting the pouring of steel, and guarding plant fences. An eastern plant expects to save $12,000 a year in guard salaries by using TV instead of foot patrols. A flying squad sits in a guard room, watches the outside fences over TV monitors (screens).

Back at the mines, TV cameras control strip mining activities, with the superintendent watching monitors that tell him what his excavating equipment is doing at any point in the excavation area. Where a human can't go safely, conveniently, or quickly, a television camera usually can.

Why the buying spree in industrial TV? In the past six years, industry has found a variety of uses for TV cameras in its plants, likes the results, and has accepted the idea. But beyond that, the story is one of alert selling and steady improvement in equipment and know-how, beginning in the 1940's.

Better Cameras Help

Equipment manufacturers are developing a king-size selling campaign leveled at the industrial market and scheduled to begin paying off early next year.

Five names are most commonly heard among the two dozen producers of industrial television equipment: Diamond Power Specialty, General Precision Laboratories, RCA, Dage, and Kay Lab. DuMont has been quiet, but the quiet will be dispelled on or before Jan. 1, 1956. The firm is strengthening sales forces, adding new equipment lines, preparing for heavy selling in 1956.

General Precision Laboratories put the finishing touches to a national sales force about a month

here's the TAB

Closed circuit TV installations can be low cost!

Here's a breakdown from a midwestern industrial TV equipment producer:

Camera	$ 905.—
Cable (100 ft.)	15.50
High definition monitor	399.—
2-in camera lens	88.—
Total	$ 1497.50

ago. RCA equipment is being distributed by Allied Radio, and is sparked by a new model camera introduced this year. Graybar Electric Co. has been distributing for Diamond, which introduced a new model camera in June. General Electric will jump into the field with a determined drive scheduled for January, distributing the equipment through its own electronics department.

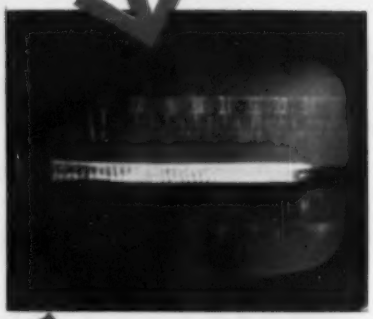
Dage is completing an expansion of its distributor forces and Dage's general manager, James Lahey, indicates his company will install 1500 industrial TV cameras in 1956. This company has at least one major technical advance up its sleeve to give their sales drive an added shot in the arm. Philco is marketing equipment produced by another builder, will be a strong factor as a distributor in the 1956 market.

Outlook Rosy

The combination of industrial acceptance and a strong selling drive is expected to skyrocket sales in 1956.

Statistics are a lean commodity in this relatively youthful industry, but shrewd guessers believe the pattern for 1956 is already apparent. A year ago, the industry was installing about 10-15 camera-monitor units each month. Four months ago installations ran about 15-20 per month. At present, a conservative 40 units are being installed monthly. By mid-first quarter next year, it's figured the industry total will be 120 per month, at which point guessing goes wild. Most optimistic is Dage, which hopes to average 125 installations per month through '56, perhaps more.

Above: **SHEARMAN watches slab line with one eye, TV monitor with the other, in slabbing mill operation at Great Lakes Steel Corp.**



Right: **CLOSE-UP view of slab line scale permits accurate cutting Screen is part of closed-circuit TV system of Dage Television Div.**

This year brought a spurt of new camera models aimed at partly solving a long standing industrial TV problem. Dim light in a plant or outdoor night lighting for a rail freight yard occasionally make necessary lighting installations costing more than the television equipment to be installed.

An overall light level of 50 to 100 ft-candles is recommended for best results. Cameras already in use handle light values as low as 10 to 15 ft-candles. And at least one installation is operating in only 6 ft-candles of light. (Traffic control in a highway tunnel.) New models offer increased contrast to brighten dim images on the monitor screen, and greater ability to produce a bright image at a low light level. One camera is currently reading a rolling mill gage in the light cast by a steel slab at red heat.

Cost Varies

Some cameras are sensitive enough that salesmen won't reveal the full capabilities of the camera, lest the competition begin a fresh counterattack.

Prices on equipment range from $1000-$5000, with cameras selling

Left: **RED HOT slab illuminates calibrated scale. Television camera picks up scale, transmits image to shearman's shanty** (above), **where cutting is controlled. Distance of control panel from end of slab makes television transmission necessary.**

for as little as $995. Average cost per installation including camera and monitor—about $2000. Labor costs boost the price. For instance, a simple $995 camera requires additional equipment including the monitor, bringing the price to a minimum $1200. Labor costs involved in the installation would increase cost by $100 to $1000 depending on the type of installation.

Lights May Cost

To this must be added cost of lighting equipment if required. And cameras may be aircooled, water-cooled, equipped with remote controlled lenses, with several lenses in a turret, remote controls to change the camera's angle of view and lens focus; even explosion-proof housings and housings to resist corrosive atmospheres. A color camera has been available for as little as $11,000. Customers who've already purchased industrial TV equipment are showing more interest in heavier equipment, up to the $3000-$5000 end of the scale.

Meantime, how is it being used? U. S. Steel employs a TV camera at its Gary works sheet mill to check surface quality of the rolling mill product, and this is one of a number of U. S. Steel installations. At Consolidated Edison in New York City, the camera studies smoke issuing from powerhouse stacks. The monitor screen is located at the furnace controls, while a TV camera studies the smokestack through a telephoto lens from several blocks away.

Argonne Laboratories uses it to watch handling of "hot" radioactive materials, a use that will grow in industry as use of isotopes increases. DuMont is a pioneeer in closed circuit 3-D television, largely for Argonne Laboratories.

Breeds Sister Industry

A number of plants and banks are transmitting images of documents over closed TV circuits. Others check incoming or outgoing freight car numbers as the cars enter the switchyard. Inaccessible gages or furnace burner nozzles are a natural for observation via TV camera. So is a workpiece in a dangerous atmosphere of protective gases. Routing of materials handling trucks on busy elevators is another.

Even at this early stage, industrial TV has progressed far enough to have developed a healthy sister industry. People call it "hotel" or "closed circuit" TV, though inplant television is also a closed circuit. The isolated TV screen delivering a lecture to several hundred viewers in a hotel ballroom, probably of speakers seated in a small committee room, is an example. Producers of these shows can bring them to multiple small screens in the ballroom, or project them on giant screens up to 20 ft high.

Several hundred dealers for a single manufacturer can be briefed on the new product or new selling techniques in the same hotel or in several hotels or theaters in several cities. Servel, one of the pioneers using closed circuit TV for dealer education, put on a coast-to-coast closed circuit show for its dealers and distributors at a cost of $1 million in 1953.

It Sells Products

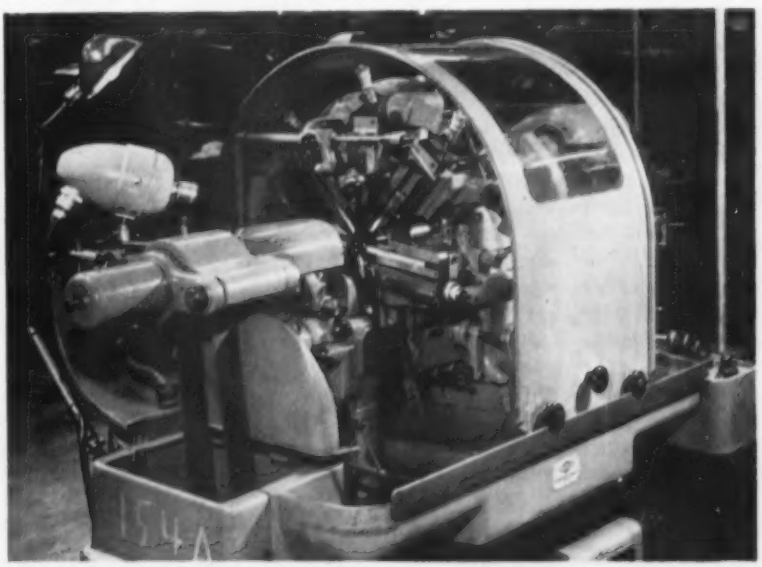
Sheraton Closed Circuit Television Co., Theater Network Television, Inc., and Wells Engineering are representative firms with a package arrangement to the manufacturer or association planning a mass presentation. Closed Circuit Television Co., New York City, announced several figures for a 23-city circuit to theaters seating 63,360. For one hour the purchaser paid $48,420 for use of the circuit to send his message. The price went to $57,000 for two hours, and to $65,000 for three hours.

Offer Fresh Figures

A fresher set of cost figures covers 1-4 hour programs and the use of two studio size TV cameras projecting on a 20 ft screen, the bill running to $2350. The circuit in this case is confined to one hotel. A smaller camera with 10 small sets could be obtained for about $400 per show.

A committee session can be televised from the committee room to a 6x8 ft screen in an auditorium in the same hotel for as little as $150 per day. The big 20 ft screens with the booming bust of a speaker projected to the full height of the screen is regarded as a potent means of imparting a sales message.

Industrial TV and its companion, educational TV, are competing for part of management's operating dollars in 1956. Both are convinced management will buy.



CAMERA mounted on the face of this screw machine makes it possible for the operator to tend several such units at the same time.

FINANCIAL

STEEL: Expansion And Prices

How to finance needed expansion looms as steelmakers biggest worry . . . Price increase discussed as most likely solution . . . No immediate change expected.

◆ EXPANSION, prices, and fast tax amortization seemed to be the major problems confronting steel producers as quarterly earnings and production reports reflected booming business conditions in the industry. New records were commonplace.

But while enjoying the boom, producers nevertheless had things to worry about. These concerns were brought out in prepared statements accompanying earnings reports and in press conference remarks incident to quarterly meetings.

Expansion is moving ahead in many companies. Announcements of expansion and improvements programs are almost a daily occurrence. The industry recognizes that it's got to expand to meet demands of a growing economy.

Capital Needed

Where the money is coming from seems to be the big question. While avoiding a direct commitment that steel prices will be raised, industry leaders have been outspoken on the theme that higher prices are necessary both to finance expansion and to attract more equity capital.

Chances are that except for scattered price boosts, nothing will be done in this direction until after the steel wage settlement next summer. Nevertheless, many producers would quickly hop onto the bandwagon should one of the bigger companies take the lead. Under present market conditions, a price increase could be made to stick.

Since the Government clamped the lid on fast tax writeoffs for steel capacity expansion, some companies have been reluctant to go out on a limb for a big program.

Roger M. Blough, chairman of U. S. Steel Corp., had this to say:

"The recent discontinuance of the Government's accelerated amortization program for the steel industry has had a dampening effect on the rate of expansion.

"My feeling is that the necessary expansion will come, and will be financed partly by an increase in prices and by depreciation. But I hope a large part will come from the realization that increasing the depreciation rate holds the key to what everybody wants — greater steel capacity."

Eugene G. Grace, chairman of Bethlehem Steel Corp., said that "of course, steel prices will be raised" to help finance industry expansion.

Usually conservative executives foresee continued good steel business through the first half of 1956. Mr. Grace said:

"We're not encouraging the placing of future business, and if we opened our books for the whole first half we'd be oversold between sunup and sundown. I feel we're assured of full operations through the first six months of next year."

Merger Balked

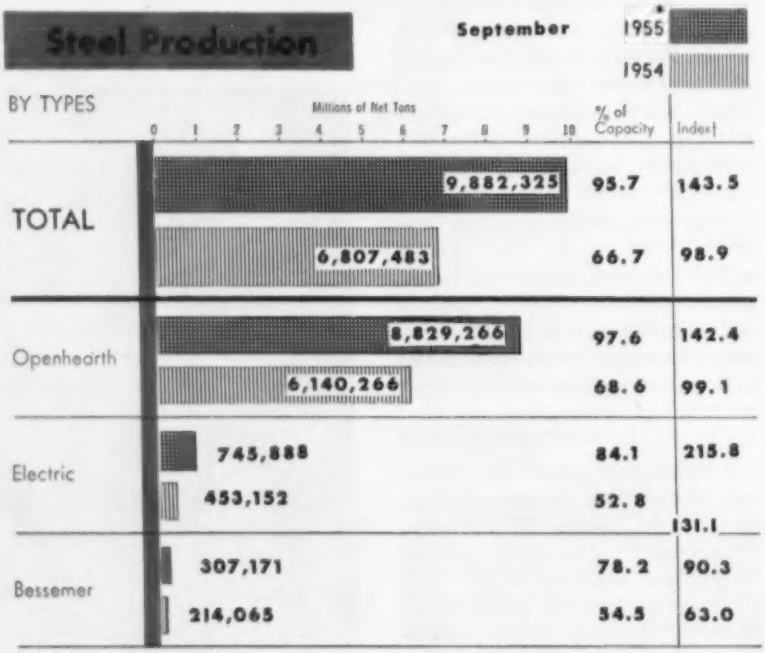
Thus far, Bethlehem and Youngstown Sheet & Tube Co. have had no luck needling the Justice Department to move toward a prompt court decision on the proposed merger of the two companies.

Steel Company Earnings

Company	Third Quarter '55	Third Quarter '54
U. S. Steel	$89,600,000	$44,323,860
Bethlehem Steel	40,359,954	25,895,437
Republic	22,005,740	10,302,001
Jones & Laughlin	12,267,000	4,387,000
National	11,468,896	6,174,370
Youngstown Sheet & Tube	11,240,677	4,474,093
Inland	13,017,983	6,875,977
Colorado Fuel & Iron	3,876,841	1,027,096
Wheeling	4,206,000	1,913,000
Sharon	1,776,903	501,578
Crucible	2,752,293	380,632
Pittsburgh	2,145,983	481,437
Granite City	5,029,116	2,419,346
Allegheny Ludlum	4,015,812	546,887
Northwestern	1,456,842	590,618
Lukens	556,906	417,069
Detroit	1,381,058	(190,938) *
Alan Wood	714,272	143,557
Rotary Electric	980,227	13,539
Continental	676,469	376,002
Acme	1,412,783	867,040

* Net Loss.

Steel Production



Source: AISI *Preliminary Figures

†Index of production based on average production of the three years 1947-1948-1949.

MACHINES: A Trend Hits Offices

Survey shows growing mechanization of paperwork . . . See 300,000 office machine operators by 1960 . . . Complex operations and lack of school training programs create growing company problem.

◆ OFFICE machines grow more complex and numerous. High school students are shying away from business subjects. Result: a growing headache for industry.

The way things are going, companies will have to put more time and effort into training office workers. Or they'll have to farm out a part of their paperwork.

Formation of companies specializing in office work is a distinct possibility. The specialist would provide service to a group of smaller concerns. He would have the work volume to support expensive machine outlays and justify lengthy training programs.

Women Stand Still

Evidence that office automation is well underway comes from Drexel Institute in Philadelphia. In a survey for National Office Management Assn., the Institute finds a definite swing to male workers for office machines.

In 1950, there were 120,000 women and 31,000 men working as machine operators. Number of women operators increased to 149,000 in 1951, has held unchanged.

The number of men operating machines has grown steadily. Latest figures show 41,000 male operators in 1954. Assuming a tendency to use male operators as machines grow more complicated, the figures indicate a mounting wave of office mechanization.

Same survey comes up with a prediction that employment of machine operators will double every 10 years for the next few decades. In 1960, there will be 300,000 office machine operators, compared with 150,000 in 1950.

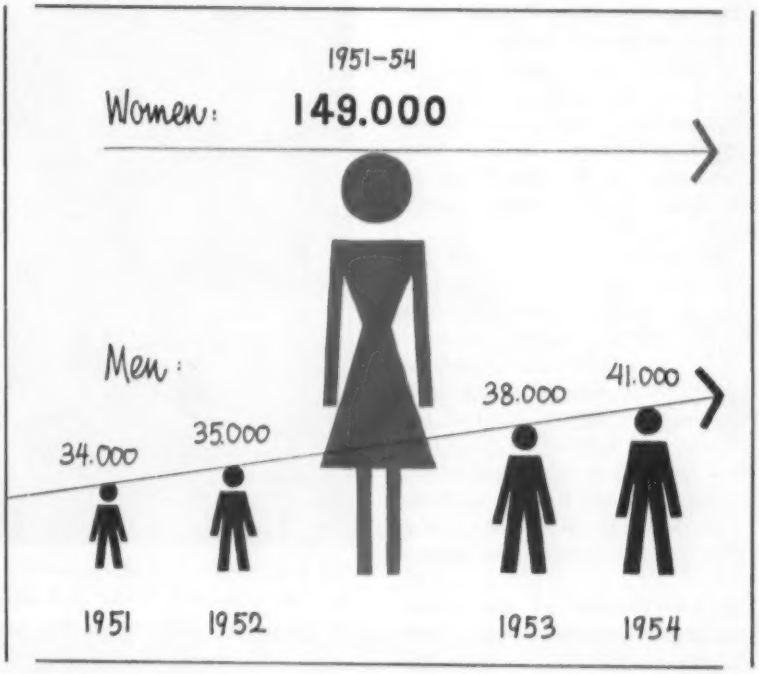
As office automation goes further, companies will have to adopt production room thinking in office operations. Regular training programs, providing a steady supply of qualified operators, will be needed to fill recurring needs.

Intricate calculators, computors and recorders will bring a greater degree of specialization. In many cases, reorganization will be needed to derive fullest benefits from special skills and equipment.

The question of job skills will undoubtably come in for re-examination. Technical, rather than clerical, aptitude may be the requisite of the office worker of tomorrow.

These and other considerations figure to take on added importance in future years. There are indications that the surface has barely been scratched in machine applications to sales, production and other problems.

Who Operates Office Machines



Union welfare funds

Labor Secretary James Mitchell is going to ask Congress next year to tighten up regulations governing administration of union-management health and welfare funds.

Various congressional committees have been uncovering abuses of such funds for several years. The labor secretary agrees that "there is a need for tightening up" present rules to protect funds from fraud and other abuses. Some unions also favor stricter rules.

INTERNATIONAL

COPPER: Price Control Might Shift

Anaconda asks concessions for new Chilean investment . . . Chile needs revenue but could lose price control . . . Outlook brighter for easier long term domestic market.—By *F. J. Starin.*

◆ THE ANACONDA CO. wants to invest $38.3 million in a new copper refinery and facilities in Chuquicamata, Chile. But they want to do it on its own terms.

If Chile agrees it could mean an easing of the tight rein held by Chile on the American subsidiary copper producers. This in turn could spell a distinct easing of the currently tight copper supply in this country.

Officials are willing to sink $21 million into a new plant to produce an additional 100 million lb of electrolytic copper annually and to recondition the refinery at Potrerillos to convert 38,000 metric tons of blister to electrolytic.

They will spend $17.3 million for a hospital, housing and public service buildings for the workers.

But they will do so only if the following stipulations are agreed to:

1. Amortization of the entire investment in a five year period.

2. Waiving of all custom fees and duties on machinery brought into the country for the new facilities.

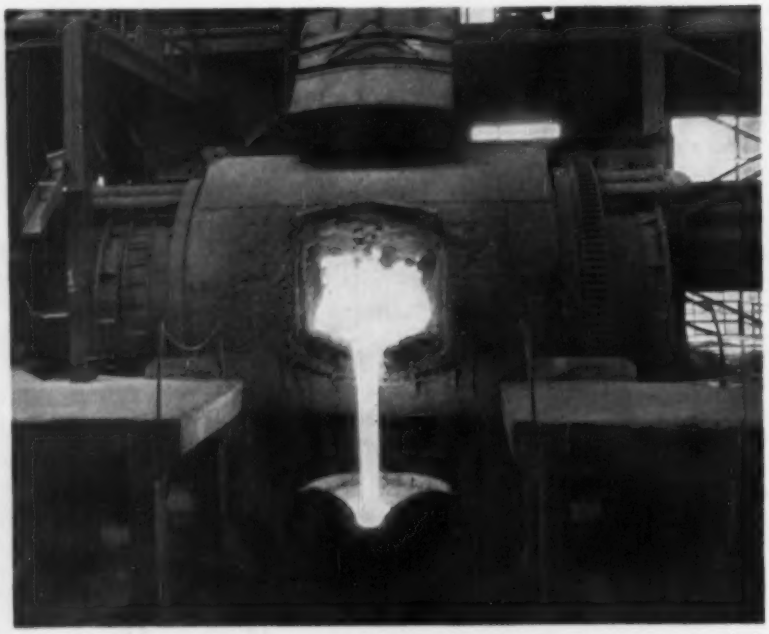
3. Annual reassessment of invested capital.

4. Chilean government authorization to sell to Chile $11 million at the free market rate. (Current free market rate is about 650 pesos to a U. S. dollar as compared with established banking rate of 200 pesos.)

5. Improvements designed to benefit workers must be considered as expense for tax purposes.

6. Guaranteed no tax increase for at least 20 years.

7. New production to be exempt from fixing, regulating, freezing or any control of prices for at least 10 years.



$21 MILLION worth of copper refining and smelting equipment is headed for Chuquicamata, Chile, if Ananconda and Chile can get together. It's the long range implications that puzzle both parties.

They may be granted or denied at the discretion of the president of the Chilean Republic.

Two Laws

The situation is made complex by the fact that there are actually two laws involved: one controlling copper, and one defining stipulations for foreign capital investments. The theories or ideas behind the laws are completely different, almost opposed.

The law, which "establishes provisions in connection with the copper producing companies," is strictly aimed at keeping tight control over operations and sales in the hands of the Chilean government. It states that "certain concessions or benefits" included in the foreign capital investment law "subject to favorable report from the copper department" may be granted by the president.

The decree on foreign capital investment on the other hand is very liberal, granting many concessions designed to bring more foreign money into the country.

Disagreement

Anaconda's proposals are obviously based on the more favorable foreign capital investment legislation. The biggest bones of contention will center around stipulations six and seven.

A guarantee of no tax increase is specifically stated in the Foreign Investment law, except that the length of time is 10 years with the proviso that the president of Chile can extend it to 20 years

subject to prior report from the Committee of Foreign Investments.

Anaconda's demand for complete control of its price is also provided for by this law. But granting both of these requests would in effect make the new facility master of its own destiny for long enough to be used as a wedge to weaken or break Chile's strangle hold on copper markets and price.

Strategy

It would make it possible for Anaconda to ship this copper to any market it saw fit — which undoubtedly would mean the U. S. And it is also possible, considering the fact that the major producers readily admit copper is overpriced, that copper from this source could be offered for sale below the standard.

A double price is obviously untenable. It wouldn't be long before the market would level off at the lower price.

Thus, even considering the fact that it takes years to get a new source really operating, Anaconda would be in position to defeat the Chilean aim of an even higher price.

Frying Pan Or Fire

The situation puts Chilean President Ibanez in an unenviable position. He has been on top for a decade and has power approaching a dictatorship.

He must deal with Anaconda because this company is by far the largest copper producer in his country.

If Ibanez refuses to grant the entire request and Anaconda sticks to its guns, then Ibanez will be criticized for hampering the expansion of the mainstay of the country's economy and the revenue that could be derived from it—not to mention the employment it would offer.

If he gives in and goes along for the additional copper, he will be the target for some powerful guns which will claim that he lost for Chile the diplomatic conflict for absolute control of the vital copper supply. His spot in the driver's seat is sure to be in peril no matter which way he jumps.

MARKETING

ALUMINUM: Color Anodizing

Reynolds' $2 million investment ready for production on architectural grids . . . Appliance, auto fields also being eyed as good sales prospects by company.

◆ THE NEW Reynolds Aluminum $2 million color anodizing line in Louisville is set to begin production of prefabricated black aluminum grids for an apartment project on Chicago's Gold Coast.

The Louisville installation, especially designed to handle unusually large assemblies, can anodize fabricated units up to 25 x 13 ft. Although products handled by the new line will be primarily for architectural applications, this is by no means the full story. High on the Reynolds list of sales prospects are the automotive and appliance industries.

Cadillac is now featuring a gold anodized radiator grille, and a major medium-price auto producer plans to use color anodized aluminum on a future model.

Although anodized aluminum has been accepted in the appliance field it has been thus far generally limited to minor appliances. The goal is wider use on major units such as refrigerators and washing machines. With a new system of modified alloys and improved control techniques, Reynolds claims the color applications will be acceptable as far as uniformity is concerned. Durability still leaves something to be desired in some colors with respect to sunfastness. With new dyes and techniques, this problem is expected to be solved in the near future. Du Pont de Nemours Co., Wilmington, Del., is setting up a development program aimed at perfecting new color dyes and pigments, and superior application techniques. Du Pont said that a recent flurry of activity in this field indicated a good potential market. The anodizing itself provides an excellent protective coating to the metal.

GOLD colored anodized aluminum grille being installed on this 1956 Cadillac at the assembly plant in Detroit is the first automotive application of colored decorative aluminum.

DISTRIBUTION

REFRACTORIES: Shipments Match Demand

First half sales skyrocket . . . Industry expects 1955 to surpass 1954 by about 40 pct . . . Despite increase in demand producers manage to keep most of their shipments current—*By T. M. Rohan.*

◆ BOOMING along with steel and other customer industries, refractories producers are heading for new production records this year.

But they're more than keeping pace with the demand. Plants are operating around the clock, seven days a week. Deliveries are good. Consumers are getting along with relatively low inventories.

Standard basic brick is being shipped from stock with only about two weeks notice. Clay brick can be shipped the same day the order is received. On a recent order for 61 carloads of special blast furnace heater brick for Youngstown, delivery was available in a few weeks. Many customers are beginning to ask for—and get—almost-off-the-shelf delivery.

The largest refractory producer, Harbison-Walker of Pittsburgh which accounts for about 25 pct of the entire industry production, reports nine months' sales in excess of $58.5 million, well ahead of 1954. This will mean 1955 sales will be over $76 million as compared with $57.5 million in 1954.

General Refractories, the second largest U. S. producer, reports sales about 55 pct ahead of last year. Another major producer expects total dollar volume to be up 40 pct over 1954.

General indications are that this will be the average increase for the industry as a whole.

Transportation

Increased use of trucks have helped keep refractories moving, especially on short hauls. North American of Cleveland, the number three U. S. producer, until five years ago had never shipped by truck from one of their producing areas. This year about 41 pct of their production is going out on trucks. Other plants report as high as 95 pct truck shipments. One of the big advantages of truck over railroad is the speed of loading-unloading.

Steel Big Consumer

Piggy-back hauling is being used by some railroads but thus far has been applied only sparingly on refractories. The increase in the number of lines offering this service indicates the usage will become more prevalent.

Productionwise, increased use of continuous tunnel kiln has helped manufacturers boost output.

Geographical consumption of refractories closely parallels the location of steel mills since this industry takes over 50 pct of refractories output. Public utilities are heavy consumers with the remainder going to nonferrous smelting and refining industries, lime and cement plants, glass plants, oil refineries, and ceramic industries.

The Situation

Industry estimates the demand for refractories in 1955 will be 40 pct higher than 1954. But, shipments thus far have also been up 40 pct. Refractories have been able to keep pace because:

1. Technological advances—increased use of continuous tunnel kilns.

2. Automation—modern refractory plants are highly mechanized.

3. Substantial inventories—built up during a slow 1954.

4. Better transportation — increased use of trucks on quick, short hauls.

Okay Tax Write-Offs

The government has approved a new group of 55 fast amortization certificates valued at $507,156,125. The list of projects being approved for fast write-off is shrinking fast, but the grand total of certificates issued since the start of the program is more than $31.7 billion.

Most of the projects in the new list involve construction of railway equipment, electric power facilities, and oil and gas facilities.

Fast amortization has been ended for all except a narrow group of defense projects.

ELECTION: McDonald Man Wins, But—

Steelworkers back union leader's candidate . . . But loss of key areas shows strong opposition still . . . Bitter contest points to stormy days ahead . . . Grip depends on contracts—By *J. B. Delaney.*

◆ DAVID J. McDONALD has beaten off the first real challenge to his leadership of the CIO United Steel Workers. But the scars will be a long time healing. Some of them may never disappear.

On the positive side, the battle provided an answer to the charge that supposedly "democratic" unions are in reality dictatorships in disguise. It aired a lot of dirty linen, but in the process it proved that the opposition still has a chance to make itself heard.

Opposition to Mr. McDonald centers around Joseph P. Molony, director of USW District 4 (Buffalo, New York State). Mr. Molony, who lived through the tough organizing days of the union, opposed Howard R. Hague, Mr. McDonald's hand-picked candidate to succeed the late James Thimmes as union vice president.

Late election returns indicate that Mr. Molony lost by something like 2-to-1. But he carried New York State, Youngstown, Wisconsin, and Mr. McDonald's home county of Allegheny (Pittsburgh).

Revolt Builds Up

If he's as ambitious as some observers believe, he may try to use this nucleus later on to snipe at McDonald policies and possibly steam up a campaign for the union presidency.

The Molony challenge has been building up for some time. He has openly opposed Mr. McDonald in the past and was outspokenly resentful when the union president cracked down on a series of wildcat strikes in the Buffalo district several years ago. Others have grumbled, too. The vice presidency issue brought things to a head.

Mr. McDonald moved into a tough spot when he succeeded the late Philip Murray as president of the union. Mr. Murray held unquestioned control of the union, which he helped found in the late 1930s. Dave McDonald was the Old Man's good right-hand for years. But he is not as immune to opposition as the revered Murray was.

VICTORIOUS in staving off first challenge, David McDonald still has organization problems.

If He Delivers

The battle over the vice presidency brought out some strange inconsistencies. One of Molony's supporters was William Hart, director of USW District 19, who spearheaded the big "Dave McDonald Day" celebration in Pittsburgh several years ago, when union and industry joined to honor the new president of the union.

As long as Mr. McDonald continues to negotiate good contracts with the steel industry, as he has since he took over the helm, there's not much chance that Molony or any other insurgent will be able to unseat him. Nevertheless, he's concerned over the split in the organization. And although Molony lost, the vote indicates there are a lot of members who don't fully agree with the way Mr. McDonald runs the union.

Show Smooth Touch

In a parallel contest for directorship of District 15, John Sullivan, McDonald's choice, defeated Paul Hilbert, but the vote was close. Sullivan won by only 500-600 votes, carrying Duquesne and Homestead. Hilbert piled up a good majority in McKeesport, and there is a possibility he will protest the vote from Duquesne.

Election campaigns for district directorships and the vice presidency reflected the professional touch. Campaign literature and tactics were on a par with those of a national political campaign. Rival candidates cooled their heels outside union meeting halls for hours, waiting for routine local and district business to be disposed of.

The Hague campaign was headed up by John Doherty, working from a headquarters in Chicago. His "Committee for Howard R. Hague" poured out a continuous stream of literature and campaign flyers directed at union members and the general public.

Until his interim appointment by Mr. McDonald to succeed Thimmes pending the election, Mr. Hague was a virtual unknown, even to some who followed the union's activities closely. Resentment over the appointment seemed to stem from the fact that Mr. Hague is a comparative newcomer.

MANGANESE: What's the Outlook?

Domestic producers want higher tariff, long-range Gov't buying program . . . Industry hits new output high . . . Current upgrading processes of low-grade ores are proving successful—By D. G. Picinich.

◆ WHAT'S THE OUTLOOK for the manganese mining industry in the U. S.?

The question was brought into focus by the appearance of J. Carson Adkerson, president of the American Manganese Producers' Assn., before the U. S. Tariff Commission. He wants the present tariff on imported manganese raised from ¼¢ to 1¢. This, he hopes, will encourage U. S. consumers to swing more of their business to domestic producers.

The industry is getting help through the government's stockpiling program, and it wants to hang onto this prop as long as possible. But on a long-range basis, producers are moving in other directions, such as the tariff, to help them build a stronger industry. A revitalized industry is needed, it's contended, in case of national emergency.

Further, domestic producers are doing a lot to improve the Mn content of domestic ores through beneficiation and other processes. This year, the industry expects to produce around 300,000 tons of high-grade ore, an increase of 50 pct over 1954, hopes eventually to supply 50 pct of U. S. demand.

Facts and Figures on Manganese

(Net Tons)

Year	U. S. Shipments	Ore Imports	Consumption
1950	134,451	1,634,925	1,838,000
1951	105,007	1,767,580	2,121,000
1952	115,379	2,668,780	1,918,000
1953	157,536	3,500,986	2,254,000
1954	211,700	2,166,144	1,658,000
1955	300,000*	.....	.....

Source: U. S. Bureau of Mines.
* Estimated.

Last year, consumption hit around 1.6 million tons. This year, it's expected to reach 2 million tons or better. By 1975, consumption will hit about 3 million tons—based on a projected steel output of 150 million tons per year.

Have Price Incentive

General Services Administration is buying high-grade ores from small producers at $2.30 per unit. Purchases are limited to 10,000 tons a producer. Nearly all the ore goes to government stockpiles. AMPA would like to see the program, due to expire June 30, 1958, continued on a much longer-range basis.

Smaller Mines Grow

The price incentive program has already effected a steady rise in the number of smaller mines in operation. These are believed to number somewhere between 50 and 100, compared to around 10 nine years ago. During the height of World War II, 131 domestic mines were in operation.

At the start of World War I, total known reserves of domestic manganese ore were less than 1 million tons. From these, domestic producers mined and shipped over 2.5 million tons of high-grade ore, over 7.5 million tons of low-grade ore.

Today, known and estimated deposits of U. S. low-grade ore run into the millions of tons. Modern beneficiation and other upgrading processes, say industry sources, are proving successful in making these reserves applicable for industry use.

Among the larger known deposits are those in Aroostock Co., Me., and the manganiferous low-grade iron ores of the Cuyuna Range in Minnesota. Prospective new sources include large low-grade refractory deposits and basic openhearth slags.

Once almost wholly dependent on Russia for the bulk of our manganese ore, U. S. consumers are importing almost nothing from the Reds. Leading foreign sources today include India, Cuba, Union of So. Africa, and Brazil. Going price currently being paid for foreign ore by U. S. consumers is around $1.04 per unit, exclusive of customs and freight charges.

Hike Pipe Duties

. Tariff duties on cast iron soil pipe will be raised as much as 12 pct as a result of a Treasury Dept. finding that the United Kingdom has been "dumping" the pipe in this country at less than fair value.

Customs officials are now investigating soil pipe imports to determine how much below fair value the pipe is being sold here. U. S. tariff laws permit duty increases when it is found that a country is dumping excess production in this country at less than its foreign market value.

Importers Complain

Six California producers originally complained of dumping and the U. S. Tariff Commission agreed. Importers are now charging, however, that the decision favorable to the Californians will "create more havoc in America's $26 billion world trade than any government action since the Smoot-Hawley Tariff of 1930." They also complain that the government defined the six California producers as "an industry" in an "unusual" decision.

Plan New Test Drill

Government agencies are directed to conduct their second test of techniques for operating from emergency relocation headquarters this fall and winter. But unlike last spring's mass drill, the latest mock emergency will be conducted by each agency individually.

Office of Defense Mobilization is directing the 30 executive agencies which participated in the last drill to set their own date for the evacuation without prior announcement. Latest drills will incorporate improvements in emergency activities learned from the mid-June operation.

ODM will permit an agency to conduct various aspects of the tests separately—they may schedule the alert; carry out the actual evacuation later, and remove to the relocation center at still another time. But ODM suggests that exact time of the test, or tests, be kept secret to provide maximum surprise.

Congress and the Supreme Court did not participate in the earlier mock attack functions and will not participate this time.

Waste:

U. S. pushes standardization of parts and names.

Some 500 government and industry technical experts met last week in Washington, D. C., in an effort to improve and promote standard production practices.

Assistant Defense Sec. Thomas Pike told the group standardization can be fostered by applying one identification name for the same object; reducing to "an absolute minimum the varieties of items, materials and processes" needed for defense, and developing a uniform quality control program. He presented suggestions on cataloging, standardization and quality control programs.

Parts Must Fit

Military now buys some 2.5 million different items. In recent months, however, some 500,000 items thought to be different have been found to be duplicates and have been eliminated.

Repair parts must be interchangeable, simple and accessible; bottlenecks must be broken; and words and symbols must mean the same thing to different people, Mr. Pike says, or the country will have to "unscramble a mess that never should have happened" in the event of an emergency.

The Justice Dept. and the Federal Trade Commission say they are not hostile to legitimate product standardization programs, but warn that programs must not limit competition or operate as price-fixing instruments. They say the trend is toward cooperation between the government and industry in developing legal standardization programs.

Speeds Battle Data

A new-type Army unit, equipped with helicopters, fixed-wing planes, jeeps and tanks, is being tested as a method of speeding up collection and transmission of battlefield information.

The new company-size unit, called "SkyCav," uses television, photographic, radio and radar in the planes and vehicles to relay information to commanders. Test will come during the joint Army-Air Force maneuvers at Camp Polk, La., late this fall.

Special weapons to be tested during the mammoth maneuver, tabbed "Sage Brush," include the Army's "Honest John" rocket, the "Corporal" guided missile, the Air Force's surface-to-surface tactical missile, the "Matador," and the Army's 280 millimeter gun capable of firing atomic artillery shells. Air Force planes will simulate dropping atomic bombs.

Chemical and bacteriological warfare will also be simulated, using harmless agents. Simulators, which when detonated resemble atomic bursts, will also be employed. Some 110,000 Army troops, 30,000 Air Force personnel, and 1200 aircraft will participate.

List Shop Techniques

New shop devices and techniques developed by the Air Force, including a quick, accurate method of cutting fine pitch worm gears, and a cable cutting and stripping tool, are described in a new Commerce Department research report.

The report, "New Shop Techniques and Developments," (PB 111668), also describes a cylindrical cam and follower for smooth operation of sensitive devices.

Win Carrier Contract

New York Shipbuilding Corp., Camden, N. J., wins a new Navy contract to build the nation's fifth super aircraft carrier.

Contract is for $119,841,034. This includes cost of preparing working plans and construction of a new graving dock. Outfitting the ship after the hull is built is expected to add about $80 million extra to the basic cost. It was lower of two bids.

Convert Demon Jets

When the Korean war erupted this country placed large orders for the Demon (the F3H) plane with McDonnell Aircraft Corp., and for the J-40 jet engine to power them from Westinghouse.

The plane was originally designed as a 22,000 lb interceptor, but wound up as a 29,000 lb all-purpose fighter. Four test pilots died in 11 crashes of the Demon before they were grounded.

The planes now use a larger engine produced by the Allison Div. of General Motors. Of the 153 planes originally purchased, only 60 will not be converted to the larger engine. The 60 have been grounded.

The Navy plans to order 220 more of the planes with the larger engine if it proves out as a "good, all-weather plane."

Total cost of the entire Demon program is about $510 million. Cost of the first abortive ordering program, including contract cancellations, is over $200 million.

EXPANSION IN INDUSTRY

New Capacity:

J&L to boost annual output by 700,000 tons

Jones & Laughlin Steel Corp. has extended its expansion program from two years to four, into 1958. To pay for the more ambitious goal, an additional $115 million will be spent to bring total expenditures to $250 million.

The program will increase J&L's annual ingot capacity by 700,000 tons. Some 400,000 tons of this will come from Cleveland Works as the result of improvements in open-hearth facilities and the addition of two new electric furnaces.

Two new oxygen blown converters to be installed at the Aliquippa Works are expected to boost capacity there by 300,000 tons. They will comprise the second such installation in the U. S. First unit was installed at McLouth Steel Co.

Improvements scheduled for processing and finishing units at Cleveland are expected to double the present capacity for the production of cold rolled sheets. Also set for installation at Cleveland are a new blooming mill, additional soaking pits, a reversing roughing mill, a continuous pickler and a four-stand tandem cold reducing mill. Additions to the soaking pits are planned for Aliquippa.

At the Pittsburgh works a new continuous galvanizing unit is expected to be in production early in 1957.

Atomic Division

With an eye toward the potential world market for commercial nuclear reactors, North American Aviation Co., has set up a separate division to handle nuclear engineering and manufacturing.

To be called Atomics International, the division will be located in a new $1.5 million building in Canoga Park, Calif.

It will be composed of about 800 scientists, engineers, technicians.

Current projects include a medical research reactor for the College of Medicine, UCLA, and an industrial research nuclear reactor for the Armour Research Foundation.

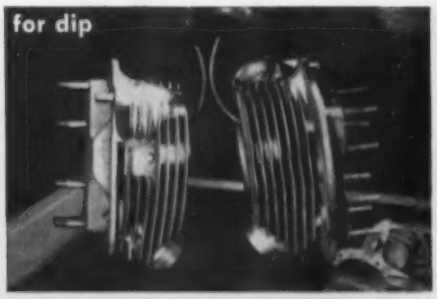
UNIVAC, efficient, rapid and well-known electronic computer, is being used by the U.S. Census Bureau to tabulate their 1954 Census of Business. The reports will be published during the next three months as the tabulations of the state-by-state survey are completed.

[redacted]

- Chesapeake & Ohio RR.; expanding coal dumping facilities; Newport News, Va.; $2.5 million.
- Chicago Bridge & Iron Co.; new welding and metallurgical research laboratory, Birmingham, Ala., plant.
- American Bosch Corp.; double capacity of Columbus, Miss., plant; $1.5 million; electronic equipment.
- Vanadium Corp. of America; new ferroalloy production plant; Jefferson County, Ohio.
- U. S. Graphite Co.; div. of the Wickes Corp.; addition to carbon finishing dept., offices, new loading dock; $600,000.
- Allegheny Ludlum Steel Corp.; additional processing facilities for electrical steel; new consumable electrode vacuum melting dept, at Watervliet, N. Y.
- E. I. du Pont de Nemours & Co., Inc.; new plant for manufacturing of Hypalon, chemical rubber; Beaumont, Tex.
- Graver Water Conditioning Co.; expanding office facilities; N. Y.
- The Peoples Gas Light and Coke Co., San Francisco; 350 mile pipeline from Tex.; $35 million.
- Aluminium Ltd.; addition of 22,000 tons of primary aluminum to Quebec facilities; $15 million.
- Trane Co., manufacturer of air conditioners, heating and ventilation equipment; 90,800 sq ft to La Crosse, Wis., plant, 30,000 sq ft to Scranton, Pa., plant; $1.3 million.

DOW . . . industry's most complete line of chlorinated solvents

DOW



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CHLOROTHENE

(Dow 1,1,1-Trichloroethane, Inhibited)

This general-purpose cold degreasing solvent, after extensive research, development and commercial use, has established itself as one of the most *versatile* solvents ever developed. CHLOROTHENE* has extremely *high solvent power* . . . makes short work of greases, oils, tars, waxes, the most troublesome contaminants. Yet stabilized CHLOROTHENE has extremely *low corrosive effects* on all common metals. Its greater *safety* appeals to users, too . . . M.A.C. is 500 ppm., as compared to carbon tetrachloride's M.A.C. of 25 ppm. Another safety feature: CHLOROTHENE has no flash or fire point; it is certificated† for use as a ships' stores article by the U. S. Coast Guard.

Easy-to-use CHLOROTHENE is made *exclusively* by Dow. Call your Dow distributor today for a supply. He's your source for vapor-degreasing solvents, too . . . stabilized DOW TRICHLOROETHYLENE and DOW PERCHLOROETHYLENE. For more information on these superior chlorinated solvents, and for the name of your local Dow distributor, just drop a line to THE DOW CHEMICAL COMPANY, Dept. S672C, Midland, Michigan.

†203 *26 April 1955*
Certificated for use as an article of stores on board vessels. This certificate covers only hazard in the use of this product. The efficiency of this product is not passed upon.

*Trademark

you can depend on DOW SOLVENTS

DOW

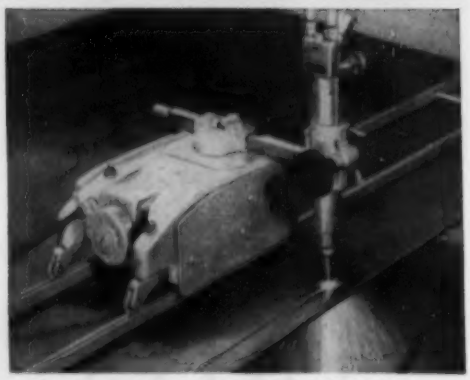
Machine-Cutting Clears the Way to $13,000 Savings

One steel company is saving up to $13,000 a year by using oxygen shape-cutting machines for making ingot and pan links from steel plate.

Previously these parts were forged at an annual cost of approximately $30,000. The speed and accuracy of oxygen shape-cutting cut costs to $17,000 a year—a savings of more than two dollars on each of the 5,000 parts made.

Machine-cutting setups are speeding fabrication and cutting costs throughout industry. Whatever your part-producing needs are—cutting hundreds of parts at one time, or one-of-a-kind turnout—there are LINDE oxygen shape-cutting machines to help you save hours and dollars in production time.

LINDE service engineers will be glad to help you determine the shape-cutting setup to best serve your job needs. Call your local LINDE representative for more information. Start saving now—call him today.



This lightweight portable cutting machine weighs only 38-lbs., and can cut metals up to 10-in. thick. It can cut straight lines, circles, and plate edge preparations in from 4-in. to 32-in. per minute.

Linde Air Products Company
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
Offices in Other Principal Cities
In Canada: LINDE AIR PRODUCTS COMPANY
Division of Union Carbide Canada Limited, Toronto
(formerly Dominion Oxygen Company)

Linde Trade-Mark

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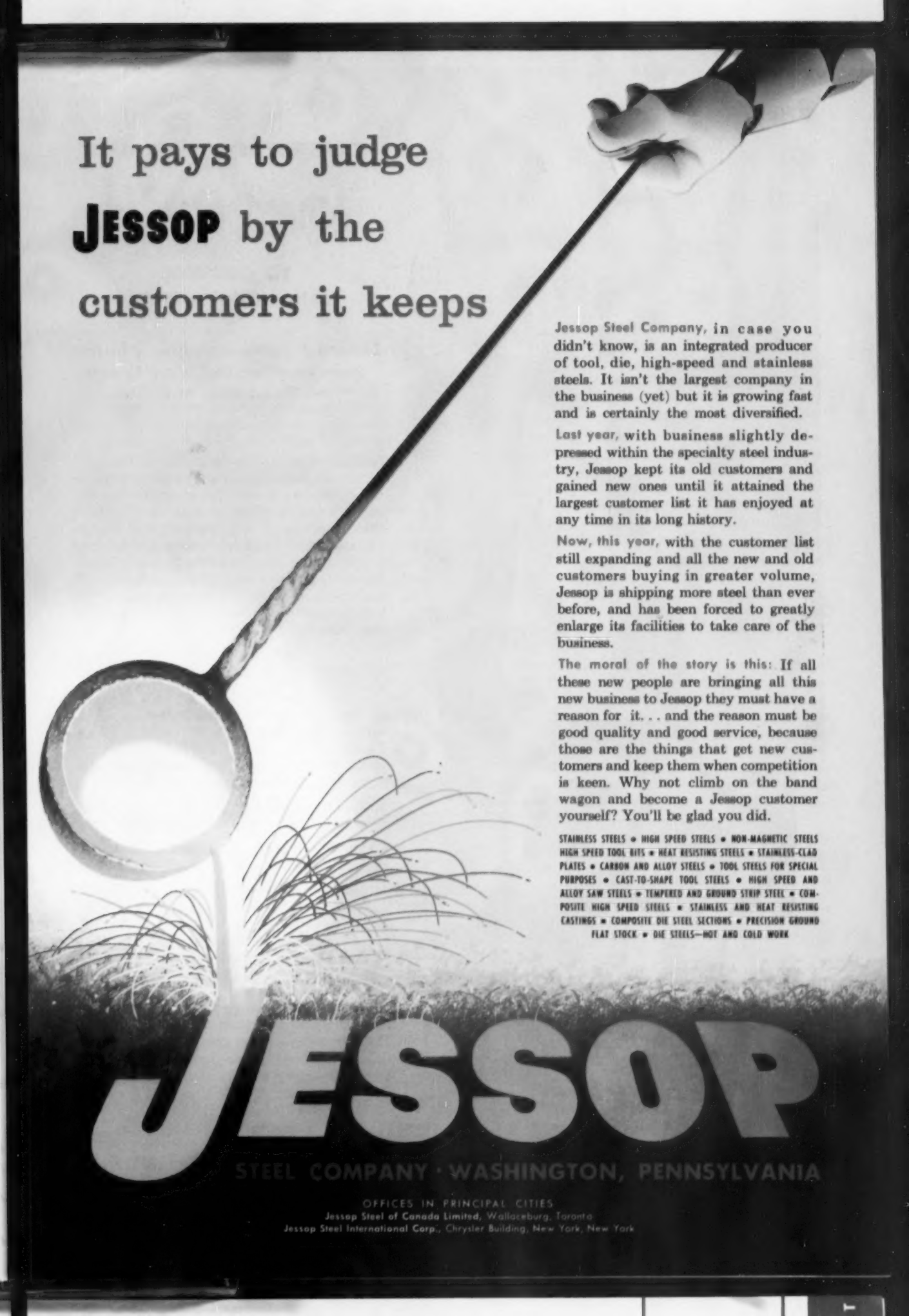


It pays to judge **JESSOP** by the customers it keeps

Jessop Steel Company, in case you didn't know, is an integrated producer of tool, die, high-speed and stainless steels. It isn't the largest company in the business (yet) but it is growing fast and is certainly the most diversified.

Last year, with business slightly depressed within the specialty steel industry, Jessop kept its old customers and gained new ones until it attained the largest customer list it has enjoyed at any time in its long history.

Now, this year, with the customer list still expanding and all the new and old customers buying in greater volume, Jessop is shipping more steel than ever before, and has been forced to greatly enlarge its facilities to take care of the business.

The moral of the story is this: If all these new people are bringing all this new business to Jessop they must have a reason for it. . . and the reason must be good quality and good service, because those are the things that get new customers and keep them when competition is keen. Why not climb on the band wagon and become a Jessop customer yourself? You'll be glad you did.

STAINLESS STEELS • HIGH SPEED STEELS • NON-MAGNETIC STEELS HIGH SPEED TOOL BITS • HEAT RESISTING STEELS • STAINLESS-CLAD PLATES • CARBON AND ALLOY STEELS • TOOL STEELS FOR SPECIAL PURPOSES • CAST-TO-SHAPE TOOL STEELS • HIGH SPEED AND ALLOY SAW STEELS • TEMPERED AND GROUND STRIP STEEL • COMPOSITE HIGH SPEED STEELS • STAINLESS AND HEAT RESISTING CASTINGS • COMPOSITE DIE STEEL SECTIONS • PRECISION GROUND FLAT STOCK • DIE STEELS—HOT AND COLD WORK

JESSOP

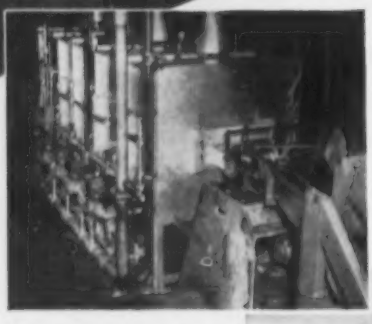
STEEL COMPANY · WASHINGTON, PENNSYLVANIA

OFFICES IN PRINCIPAL CITIES

Jessop Steel of Canada Limited, Wallaceburg, Toronto

Jessop Steel International Corp., Chrysler Building, New York, New York

Foreman examines Speedomax H control record chart for furnace shown.



Four-zone American Gas Furnace Co. shaker-hearth furnace, Lamson & Sessions Co., Cleveland.

Special bolts immediately after heat-treatment. Lamson & Sessions headed and threaded products of all kinds are handled by the Speedomax-controlled furnace.

FASTENER MFR. NOW USES

Speedomax® H

TO CONTROL HARDENING FURNACE

Lamson & Sessions finds new instrument easy to read, easy to set, small and easy to install

• Heat-treatment in the production of bolts and other fastenings is an old story to Lamson & Sessions in their big plants around the country, but they have recently come up with what looks like a real improvement in control at their Cleveland factory. When they added another American Gas Furnace shaker-hearth unit, they decided to equip it with the new Speedomax H controllers, and they're well pleased with results. Here are features they like:

1. Easy to read at 20 feet; both for operator at furnace and for foreman as he walks down the aisle.

2. Space-saving size; panel for a 4-zone furnace is considerably narrower than older panels for a 3-zone unit . . . especially interesting when space in heat-treating department costs several dollars a foot per year.

3. Quick and easy setting of control point; saves time of busy instrument men.

4. Quick and easy to get; no Speedomax H shipment has lagged by as much as one day.

This compact, trustworthy companion to our older, much larger Speedomax G can't do the unusual things the G does, but it gives you a solid, fully accurate job of either on-off control or of two-or-three-function control for hundreds of processes.

Speedomax H is made as an Indicator only, as an Indicating Controller, and as either Round-chart or Strip-chart Indicating Recording Controller. You can get complete description and full application-engineering service from our nearest office or from 4956 Stenton Avenue, Philadelphia 44, Pa.

LEEDS **NORTHRUP**

instruments — *automatic controls* • *furnaces*

Report to Management

In an Expansive Mood

There's no doubt about industry's firm intention to continue expansion. You see new evidences of it every day when plans are announced or new loans negotiated to finance corporate growth.

You can generally interpret these plans favorably. They indicate confidence in continuing and growing economic prosperity. They usually mean big expenditures for tools, fixtures, and construction materials. Also, bigger payrolls.

The question now arises over how far this trend can be continued with safety. As usual, the cautioning word comes from the financial experts who traditionally adopt a safe course, even to the point of sounding bearish.

They warn that some smaller businesses want to expand for no sound economic reason, but just because the whole economy is expanding. They want to follow the trend, don't want to get left at the post.

What's the Answer?

Don't be misled by either rule of thumb. While a word of caution is always advisable, a decision whether to invest in capital improvements depends on your own set of factors.

Weigh your decision on what the outlook is for your particular business. If your field is an expanding one, don't be misled into retrenching. If your field is not one of those that is growing with the economy, the time has come to re-evaluate your position.

Are You Getting Your Share?

In this era of economic growth, there is something wrong if your business isn't keeping pace. It isn't necessarily your fault if markets and other business conditions change at your expense. But don't wait too long to change to meet them.

That is the time to look for new markets, study possible diversification, evaluate your company for possible entry into other fields, or up your budget for research and new product development. Expansion without purpose won't help anything. But to stand still these days is to retreat.

Down on the Farm

It's easy to fall into a pattern of thinking. A good example of this is the viewing with alarm of the downturn of farm income. There's another side of the picture that may be of more importance to you.

The farm isn't what it used to be, even a few years ago. It has become a business of fewer, larger units, more mechanization into more highly specialized businesses. Although farm output is 50 pct greater than in 1920, it is accomplished on fewer acres by many fewer farmers.

The farm income picture is misleading to a great extent. There is still untapped purchasing power backed by good credit. And it is going to farm modernization and mechanization. Workers are being drawn from the farm to industry to be replaced by machines. Even with lower income, the farm will continue to be a big market for machinery and manufactured products.

The Insurance Picture

As an average businessman, you may not be aware of the growing importance of insurance on your business, how it affects you, how you can get the best results for your own particular business. Make sure you are getting proper counseling, it's vital in this increasingly complex and important function of executive planning.

INDUSTRIAL BRIEFS

Plastic Pipes . . . Facilities being installed in the Cleveland plant of Republic Steel's Pressed Steel Div. are expected to double total output of plastic pipe within the next few months. Until now Republic's entire plastic pipe production has been from their Magnolia, Ark., operation.

Award . . . Lukens Steel Company's 1954 annual report was judged best in its field, Small Steel and Iron Companies Industry, in a survey by Financial World magazine.

Tax Suggestion . . . A committee of the American Institute of Accountants has submitted a list of 226 recommendations for income tax changes to federal authorities. The aim of the study is to remove inequities that unfairly burden taxpayers in some situations.

California Steel . . . American Iron and Steel Institute has indicated that production of steel in California in 1955 may exceed 3 million tons—a new record.

Meter Technique . . . The use of gas meters to measure the pressure of dehydrated air in a sheath surrounding telephone cables has enabled Southwestern Bell Telephone Co. to reduce maintenance costs. The air protects insulation from corrosion; and at the same time a change in the air pressure recorded by the meters indicates a leak which may be fixed before any appreciable damage can be done.

Safety Film . . . Caterpillar Tractor Co., Peoria, Ill., has released a new safety film highlighting dangers encountered by construction crews in reconditioning old roadways. The firm's earlier safety movie, "The Perfect Crime," received an award from the National Safety Council.

Seven Wonders . . . The American Society of Civil Engineers has made public what it considers to be the Seven Wonders of Modern Civil Engineering in the U. S. They are: Chicago Sewage Disposal System; Colorado River Aqueduct; Empire State Building, N. Y.; Grand Coulee Dam and Columbia River Basin Project, Wash.; Hoover Dam, Arizona-Nevada; Panama Canal; San Francisco-Oakland Bay Bridge.

Carbide On Steel . . . A method of applying thin layers of tungsten carbide to steel has been developed by the Carboloy Dept. of General Electric, Detroit.

New Address . . . The American Management Assn. will move its headquarters to the Sheraton Astor Hotel at Times Square, N. Y.

Wordwriter . . . The IBM Corp. has developed the electric wordwriter, which prints any of 42 common words or phrases with touch of a single key.

Mechanical Mole . . . A subsurface washer to combat certain backwash difficulties occurring in filtration and ion exchange materials, has been developed by Graver Water Conditioning Co., N. Y.

Men Wanted . . . Electronics specialists are urgently needed to conduct research on new devices for military use at the Corps of Engineers Research & Development Laboratories, Fort Belvoir, Va., says Col. J. A. Graf, Army engineers.

Going Up . . . The new Walt Whitman Bridge over the Delaware River will connect the major highways of Philadelphia with those south of Camden. It is expected to carry 15 million vehicles in its first year of operation.

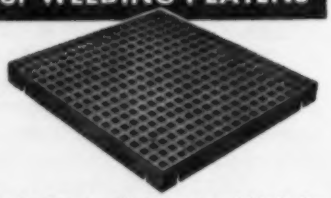
Machinery Lease . . . Progressive Welder Sales Co., Detroit, is now offering their complete line of resistance welding equipment on a lease basis.

New Name . . . The board of directors of the Consolidated Engineering Corp., Pasadena, Calif., has approved a change of the company name to Consolidated Electrodynamics Corp., in order to "appropriately describe the operations of our company." The prospective change will have to be okayed by the stockholders before it can become official.

Air Force Movie . . . A sound, color motion picture titled, "The Air Force Procurement Production Story" is now available from Air Material Areas and Air Procurement Districts in all parts of the country.

Order Index . . . The index of orders placed by industrial distributors jumped from 181.2 for August to 203.2 for September, a new record. In only four months of the Korean War, January to April, 1951, has the index previously crossed the 200 mark. The current order rate is more than double that of the base month, July, 1948 (100).

BENDING BLOCKS or WELDING PLATENS



5 ft. by 5 ft. by 5½ in. cast steel blocks for layout, welding and assembly. Write today for information. Other sizes. Tools, stands & accessories.

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FACING A TOUGH PROPOSITION?

you can beat it with *JALLOY*

Only a seasoned hunter with the right equipment can stand up to a charging rhino. And, likewise, only a special steel like JALLOY can withstand severe impact and abrasion . . . day after day. In comparison with mild steels as well as other abrasion-resistant steels, JALLOY gives outstanding results when heat-treated to your specifications.

This modern heat-treated plate brings savings in steel costs, maintenance, and repair, and also is easily welded. JALLOY is available in three grades, each of which is designed for specific applications.

Jalloy Plates outlast other steels by margins of 4 to 1

Jalloy lowers maintenance costs on ore and coal conveyors

Jalloy provides longer wear with less repair in truck bodies

Jalloy Aprons in Tyrock screen last 3 times as long as other steels

Jalloy heat-treated steel plate beats wear due to impact and abrasion

J&L STEEL

Complete data concerning CHEMICAL COMPOSITION . . . HEAT TREATMENT . . . WELDABILITY . . . PHYSICAL PROPERTIES . . . will be mailed to you promptly. Write today.

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AUTOMOTIVE ASSEMBLY LINE

Will Auto Suppliers Be Frozen Out?

Integration trend finds carmakers producing more of their own parts . . . But booming sales demand heavy outside buying . . . And parts makers have moved into aircraft, other markets—By T. L. Carry.

◆ DESPITE the wave of integration in the auto industry, independent manufacturers who make parts for cars are not going to go out of business.

With the volume of auto production being what it is today, no company could possibly make all the parts necessary for a car, even if it were economically feasible.

Cost determines whether an automaker buys a part or makes it.

And since the end of World War II, the auto industry has found that in a great many cases it is cheaper to make, rather than buy parts. So the tendency to integrate production has grown considerably.

Suppliers Lose Ground . . . Before the war, when an annual production of 3½ million cars was considered big stuff, auto manufacturers made approximately 40 pct of their own parts and bought the other 60 pct from outside sources. Today, home production has increased to the point where the ratio is estimated at 50-50.

The interesting part of all this is that, although auto companies are making more parts, they are spending more for outside supplies. Ford Motor Co., for example, spent $1 billion for outside goods and services in 1946. This year, the company estimates it will spend in excess of $3 billion for the same things.

Why Costs Climb . . . The reason behind the increased spending is the increase in auto production. Companies may be buying a smaller percentage but the actual number of parts is about the same and in some cases larger.

Another factor which supports the theory that there will always be a place for parts suppliers is the competition within the industry. There have been cases where a supplier division within a corporation has lost a job for a car-making division within the same company because an independent supplier made a more competitive bid.

Parts Men Move . . . The parts manufacturers have not been standing still while the auto companies have been integrating. Some have diversified their production.

Motor Wheel Corp. in Lansing, Mich., is now making lawnmowers in addition to its auto business. Bendix Corp., a major source of brake components, has reached the point where only about 12 pct of its production is for autos. The major part is for the aircraft industry.

In the past 2 years, out of approximately 400 firms making auto parts, 40 have merged with other firms.

Why They Merge . . . There are several reasons for the mergers but the biggest cause is the decrease in profit margins. With the high cost of labor and materials, suppliers are faced with two alternatives. They can either try to make money by increasing volume or price their products out of the market.

This being the case, the mergers are likely to increase. Just as automobile companies have become fewer and bigger, so will parts supplier firms. The result is that fewer companies will be getting a bigger share of the parts business.

OLDSMOBILE expects this model to be a big item in their drive for a bigger chunk of the market in 1956. Deluxe Holiday coupe, "98" features a newly designed grille, bumper and hood contour and a 240 hp motor.

Extreme Accuracy ...with a BULLARD Spacer Table

Builders of the P2V3 Neptune Anti-Submarine Aircraft, The Lockheed Aircraft Corporation, have this to say concerning their experience with the Bullard Spacer Table employed to machine a cast aluminum support for the Sonobuoy Chute.

"Before we used the Bullard Spacer Table, we put this kind of work (boring 3 holes of 5.250 diameter) either into a jig or on a horizontal boring machine".

"The reason we put this piece on the Bullard Spacer Table is that the holes are too large for a drill jig and dial spacing for hole location on the horizontal was time consuming. What is more remarkable about the Spacer Table is the fact that it can handle such large diameters with the greatest accuracy.

"Another advantage of the Bullard Spacer Table is the simplified tooling. All we need is a simple holding fixture. The spacing is done automatically by the Spacer Table".

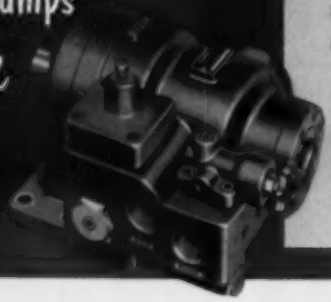
these advantages can be applied to your machining problems. Ask your nearest Bullard Sales Engineer or Distributor or write us for Spacer Catalog

THE BULLARD COMPANY
BRIDGEPORT 2, CONNECTICUT

Do You Want To Save Horsepower and Heat?

VICKERS

Two-Pressure Oil Hydraulic Pumps Require Less Power for Two-Pressure Circuits



Automatically Provide

High Volume @ Low Pressure for fast closing, rapid advance, and rapid return.

•

Low Volume @ High Pressure for feeding, compressing, clamping, and holding.

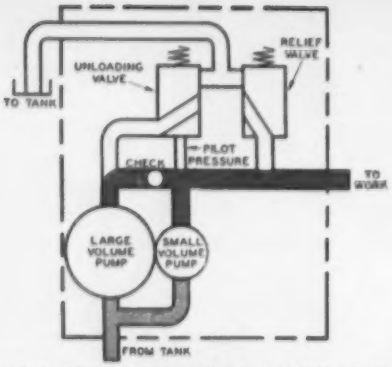


Fig. 1 Combined Delivery of Large and Small Volume Cartridges at Low Pressure

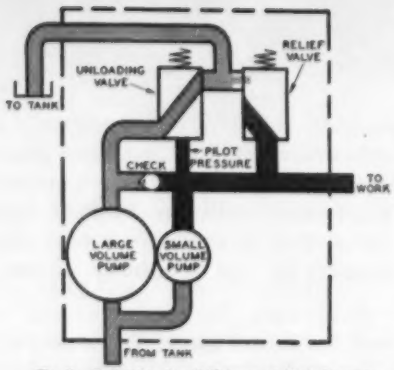


Fig. 2 Delivering Small Volume at High Pressure

Two Vickers Vane Type pumping cartridges are mounted on the same shaft—in the same housing, driven by the same prime mover. One provides a large volume of oil while the other delivers a small volume. These Vickers Two-Pressure Pumps have proved advantageous in a wide variety of applications.

For example, in closing a press or in rapid advance, both pump cartridges work together, supplying maximum volume for quick operation (see Fig. 1). When the press is closed and compression begins, or when the tool goes into feed immediately prior to beginning the cut, the large volume cartridge is automatically unloaded to the reservoir at zero pressure (see Fig. 2). The small volume cartridge alone then provides the lower volume required at high pressure.

These Vickers Two-Pressure Pumps are most economical in power consumption for such two-pressure operation. The reason for this is that a small-volume pump working at full capacity is MORE EFFICIENT than a large-volume pump working at partial capacity. Regardless of momentary delivery, the internal leakage of any pump is proportional to its size and operating pressure. The chart (Fig. 3) shows an interesting comparison between a Vickers Two-Pressure (Two-Volume) Pump and a variable volume vane type pump on a press circuit.

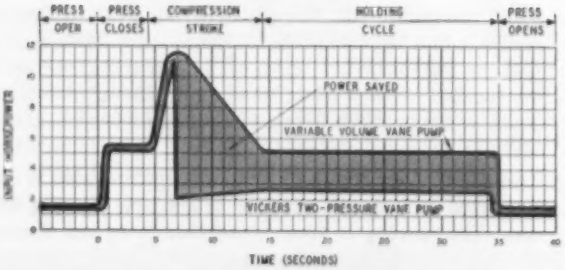


Fig. 3. On this typical press application the saving in power is approximately 50% with a resultant saving in heat in the system.

Like all Vickers Vane Pumps, these two-pressure pumps have the hydraulic balance feature that relieves bearings of all pressure loads (one of the major causes of wear). Cartridge construction enables customer to service in his own plant instead of returning to factory should repairs be necessary. Relief and unloading valves are integral . . . minimizing piping and connections. Complete range of sizes up to 48 gpm. For additional information, ask for Bulletin 54-70a.

4895

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ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Oct. 29, 1955	161,727	26,383
Oct. 22, 1955	142,137	27,060
Oct. 30, 1954	71,366	19,296
Oct. 23, 1954	48,289	14,087

*Estimated Source: *Ward's Reports*

Debut:

Delayed arrival of GM line stirs talk of worry.

The majority of 1956 cars have already been introduced but General Motors got into the act with a bang this week. The public announcements of Buick, Chevrolet and Oldsmobile completes the line for GM.

The fact that GM waited longer than its two major competitors to announce its cars had led to some interesting speculation in Detroit.

One of the reasons being advanced for the late introductions is the tremendous market that was available for 1955 cars. Observers will tell you that as long as GM could sell this year's cars, the corporation could see no reason for starting 1956 production.

See Good Year

At the same time, the opinion is being advanced that GM might suspect that next year's market will not be as big as 1955, although nobody concerned would ever admit it publicly.

All of GM's car divisions are full of confidence regarding the 1956 market. Chevrolet has set a production objective of 2½ million cars and trucks, an increase of 200,000 vehicles over 1955.

Change Grille

For 1956, Chevrolet has increased the length of its cars 5 in. A new chrome trim treatment and the adoption of chrome spears help accentuate the length. The hp in the 6-cylinder engine has been increased to 140 and the V-8 engine will produce 205 hp with a special power package.

Buick's 1956 models feature new grilles and redesigned taillights. Wheelbase on the Special and Century series is 122 in. and 127 in. for the Super and Roadmaster. A second stator has been added to the Dynaflow transmission which improves performance in the low speed range. For the first time, all Buicks have the same size engine which is 322 cu in. and develops either 220 or 255 hp.

The outstanding change in the new Oldsmobile is a redesigned grille which is patterned after the division's experimental Delta and Starfire autos previously displayed at GM's Motoramas.

To show how the value of automobiles has increased, J. F. Wolfram, Oldsmobile general manager, compares the prices of the 88 Holiday coupe in 1950 and 1956. The 1950 model listed at $2056, compared to $2330, 1956 asking price.

But Mr. Wolfram claims that, if the dollar is adjusted to the cost-of-living index, the difference in the two prices is only $17.

The new models are 2½ in. longer than they were in 1950 and develop 95 more hp. In addition, they are heavier and give more fuel economy through the use of higher engine compression ratios.

AUTOMOTIVE NEWS

Push Power Steering

Power steering will be sold on four out of five cars in the next five years.

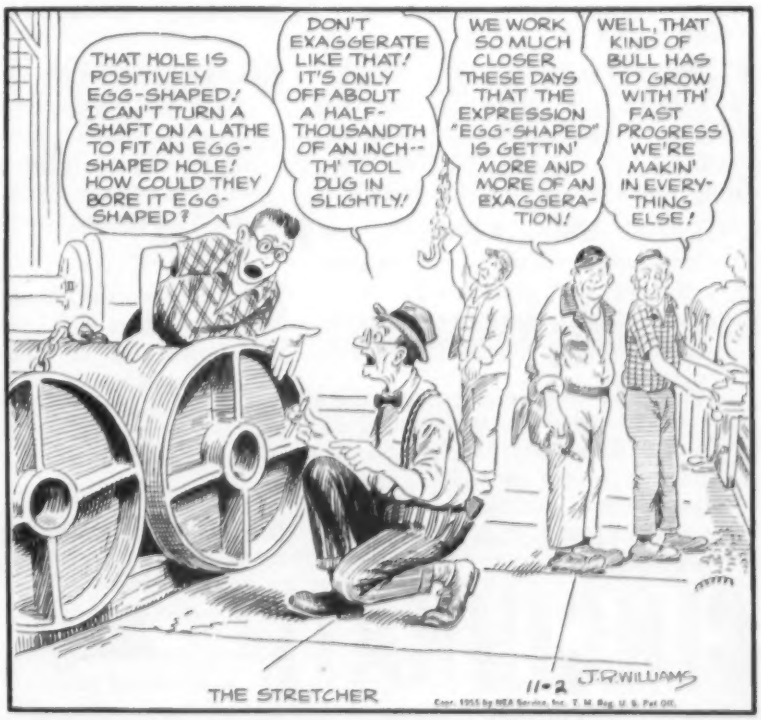
Improved design and reduced prices lead auto executives to make this prediction. Since 1951, price of power steering to the car owner has dropped from about $200 to $50 for linkage units. Integrated units sell for as much as $125.

New designs feature compactness and fool-proof operation. Saginaw's new integrated unit weighs 38 lb against 58 lb for the previous design. For use on General Motors cars other than Chevrolet, new gear has only 49 parts.

On many of the GM units the steering gear ratio has been reduced from 19 to 1, to 17.5 to 1.

Right now, about half of all passenger cars sold are equipped with power steering. Close to 15 pct of the trucks sold have the power units.

THE BULL OF THE WOODS — By J. R. Williams

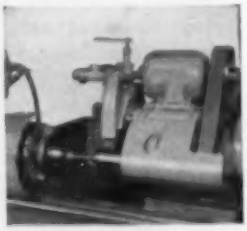

THAT HOLE IS POSITIVELY EGG-SHAPED! I CAN'T TURN A SHAFT ON A LATHE TO FIT AN EGG-SHAPED HOLE! HOW COULD THEY BORE IT EGG-SHAPED?
DON'T EXAGGERATE LIKE THAT! IT'S ONLY OFF ABOUT A HALF-THOUSANDTH OF AN INCH--TH' TOOL DUG IN SLIGHTLY!
WE WORK SO MUCH CLOSER THESE DAYS THAT THE EXPRESSION "EGG-SHAPED" IS GETTIN' MORE AND MORE OF AN EXAGGERATION!
WELL, THAT KIND OF BULL HAS TO GROW WITH TH' FAST PROGRESS WE'RE MAKIN' IN EVERY-THING ELSE!
THE STRETCHER
11-2
J.R.WILLIAMS

Power rapid positioning . . . eliminates tiresome hand cranking from one diameter to another.

Improve Your Precision Toolroom Grinding In Three Ways . . . with NEW

Cincinnati Filmatic Universal Grinding Machines

FILMATIC grinding wheel spindle bearings...never wear out; never require adjustment.



Internal grinding head . . . permanently mounted on wheelhead, always ready for the job.

Cross feed unit . . . completely new; two-speed; pickfeed all the way to final size.

It's difficult to improve upon top performance, but it can be done. In toolroom grinding, for example, the new CINCINNATI FILMATIC 12", 14" and 18" Universal Grinders offer three-way improvement:

1—*Improved accuracy.* A new cross feed unit assures closer accuracy than ever before on your precision toolroom work; automatic pickfeed to a positive stop; .000050" minimum increment of adjustment.

2—*Improved convenience of operation.* Table and cross feed handwheels are raised to a more comfortable height. New headstock speed selector is easier to operate. Push buttons are relocated for easier accessibility.

3—*Improved versatility.* Wider selection of quills, spindles and collets for the hinged internal grinding head, a Cincinnati original. Pickfeed at either end or both ends of table cycle. Power rapid positioning (extra) for wheelhead.

These cost-reducing improvements are in addition to other well-known Cincinnati advantages such as FILMATIC grinding wheel spindle bearings. That's why CINCINNATI Universal Grinders are your best buy. Get all the facts by writing for catalog No. G-663.

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Are Curbs Killing the Boom?

Credit measures draw protests . . . Industry sees money getting too tight . . . Administration plans eased restrictions in 60 to 90 days . . . Tax cut will boost buying power next year—By G. H. Baker.

◆ IF YOU think the brakes on the boom are being applied too sharply, cheer up. The Eisenhower Administration is ready to ease the pressure on the brake pedal soon after the first of the year.

Complaints from business and industry that money is getting a bit too tight, that the Administration is going too far in letting the steam escape from the boom, have just about convinced the White House financial strategists that they can ease up on current restrictions in the next 60 to 90 days.

By Spring, they may even be ready to step on the gas a bit.

Credit Pinch Eases . . . High cost of borrowing money has about reached its crest, and should drop off somewhat before long. Policy planners in the Administration claim credit for slowing up the inflationary trends of last summer, and now are talking behind the scenes of dropping some of the anti-inflation curbs.

A lowering of bank rediscount rates will bring down interest rates for purchasers of new homes, automobiles, and household goods.

Tax reduction, which shapes up as a likely political prospect in Congress, will have the effect of diverting still more dollars into the consumer spending stream.

No doubt about it, the Administration intends 1956 to be a year of high income, lower taxes, and a record volume of money in circulation.

All signs spelling out this feeling are already very clear.

See Happy Union . . . Merger of the AFL and the CIO will be a "notable success" the head of the National Labor Relations Board predicts. And he says flatly that all citizens—not just union members—are going to be better off as a result of the coming amalgamation.

Unions have been wasting their time and substance in competing with each other for members, Mr. Rodgers points out. From now on, the unions can expand all their time, energy, and money in organizing the unorganized. It is "an undisputed fact," he says, that organized workers are better off than unorganized workers.

Unionization and collective bargaining will come to encompass an ever-broadening part of our economy, the NLRB chief states. He suggests that the AFL-CIO merger is planned for the same reason that many business mergers are planned—to gain greater efficiency, overcome handicaps.

Study Tax Scramble . . . Excise taxes are headed for some badly-needed straightening out next year.

Examples of inequities were brought to light in the recent public hearings before the tax-writing Ways and Means Committee. It was shown that some manufacturers are taking an unnecessary tax beating from the government.

There is no real attempt on the part of the tax-collecting Internal Revenue Service to favor one manufacturer over another — it's just that the left hand of the IRS doesn't always know what the right hand is doing.

Testimony presented to the Ways and Means Committee brings out that some manufacturers of automotive parts are taxed at one rate, while other manufacturers of similar products are taxed at another.

In such cases, it's felt, inequities, while not directed at certain producers, are nevertheless unfair.

Urge Car Price Probe

▪ Walter Reuther's success in getting Congress to investigate the "dangers of automation" has steamed up CIO hopes for a similar investigation of automobile prices.

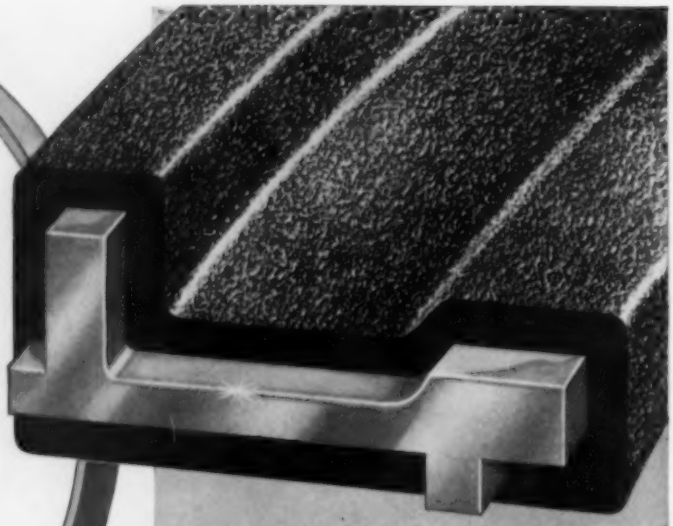
▪ Mr. Reuther's United Auto Workers (CIO) says automobile manufacturers "cannot justify" price increases on new cars. The union says industry should absorb its higher costs (wages, steel, copper, and aluminum all are up in the past six months) and at the same time should reduce prices.

▪ "We will keep right on pressing for a congressional investigation so that the facts can be brought before the public," the UAW says. Price "gouging" by auto manufacturers is spreading, Reuther claims.

RINGS

ROLLED & WELDED FROM A MILL-ROLLED SECTION

SAVED $220.63 EACH*



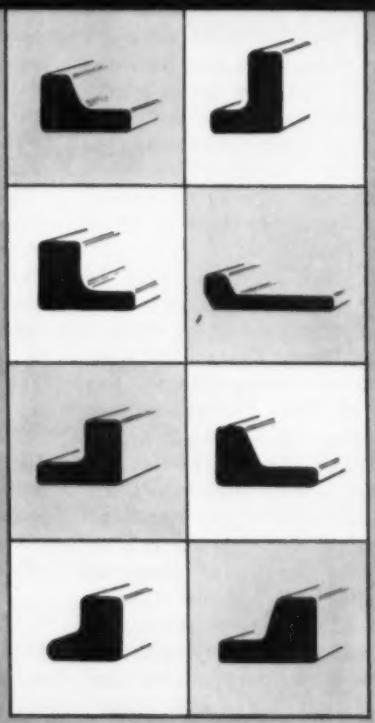
A ring originally designed to be machined from a casting that weighed 390 lbs. cost the buyer $280.00. Working with American Welding the part was re-designed to be machined from a rolled and flash welded ring made from a special mill-rolled shape.

These triple savings resulted:

1. Basic cost of the ring, before machining, was reduced to $59.37 — a savings of $220.63.
2. Critical material used, before machining, was reduced to 94.5 lbs.— a saving of 295.5 lbs.
3. The contour shape of the mill-rolled section saved additional time and money on finished machining.

*Actual case from a leading manufacturer of jet aircraft engines.

TYPICAL MILL-ROLLED AND EXTRUDED SHAPES AVAILABLE FROM AMERICAN WELDING



Can American Welding help cut costs in your plant? Send us your blueprints. We will be glad to study your problem.

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Rulings Conflict . . . A parallel situation exists in the taxation of radio and TV tubes. One firm asks for and receives a conflicting ruling. One may be told to pay a high rate; another a lower rate of tax.

Tax experts in the House are hopeful that they can iron out most of these discrepancies in a new tax bill next year. The main purpose of such legislation will be to correct the inequities and make rates equally applicable to all.

Minor adjustments in rates may be made, but the main purpose of the bill is to make some sense out of the sprawling, jerry-built excise tax structure.

Barometer:

New statistical system may call economic turns.

A new economic barometer, expected to furnish businessmen and marketing analysts with reliable advance warnings of economic developments, is being set up by the Federal Reserve Board. The Board has spent nine years developing the new statistical system.

The new system, called "flow of funds accounting," furnishes parallels of the past as guide lines to meet future economic problems. It will pinpoint to the greatest degree of any system yet the financial status of consumers, showing their sources of income, expenditures, and their economic behavior patterns.

Statistical series using the flow of funds principle will appear yearly at first, but will be brought out on a quarterly basis in a few years. Flow of funds figures soon to be made public are expected to throw new light on what occurred during the 1949 recession.

Release Census Data

First of a flood of valuable business and market information for businessmen is now coming out of the U. S. Census Bureau. It won't stop until a giant "Univac" electronic computor finishes spewing out figures.

Detailed results of the nose-counting project covering business, industry, and mining in 1954 will be published in paperbound bulletins with separate area, industry and subject tabulations. The same figures, along with more complete explanatory material and comparisons, will be permanently bound late in 1956.

Processing of the business censuses, which used to take about a year, has been cut in half by use of the Univac—office automation.

U. S. May Sell Shop

The government may sell its New Castle, Pa., machine shop and foundry to United Engineering and Foundry Corp.

United officials have been conferring with the General Services Administration in Washington regarding possible sale of the government-owned facility.

Aid Distressed Areas

Government assistance to so-called "distressed areas" has been working on an "on-again-off-again" basis for several years.

President Eisenhower's new instructions to his staff are to (1) juice up contract awards and federal grants, and (2) then keep the program rolling on a steady basis.

Areas likely to be on the receiving end of the new aid program include Scranton, Pa.; Wilkes-Barre, Pa.; Johnstown, Pa.; Lawrence, Mass.; Lowell, Mass.; and sections of West Virginia.

In addition to the awarding of federal contracts to the depressed localities, the White House planners are giving serious thought to other aid devices, such as fast tax write-offs to firms willing to build or expand in the areas, special technical assistance from the government, public works and low-interest federal loans to business.

To speed administration of assistance, Ike has ordered the combining of all existing distress-area programs into a new super-agency, which will be created within the framework of the Commerce or Labor Departments.

WASHINGTON NEWS

Bias:

U. S. steps up drive against job discrimination.

Government is threatening to force, probably by means of federal law, compliance with antidiscrimination clauses in government clauses unless business and industry solve the problem on their own.

Labor Sec. James Mitchell, telling a group of 65 business and industrial leaders that there is a "great deal" of job discrimination in this country, warns:

Contracts Bar Bias

"If we do not find the solution ourselves, somebody else is going to find it for us."

Government contracts require that suppliers do not discriminate because of race, color, creed or national origin. Sec. Mitchell says this part of the contract is not always observed, but the government has not yet cancelled a contract because of job discrimination.

The primary problem in the field of employment now is not in hiring but in promotion of minority group workers.

The fears that many companies have had in eliminating discrimination, particularly in the South, have not proved to be justified.

AEC Wants Boral

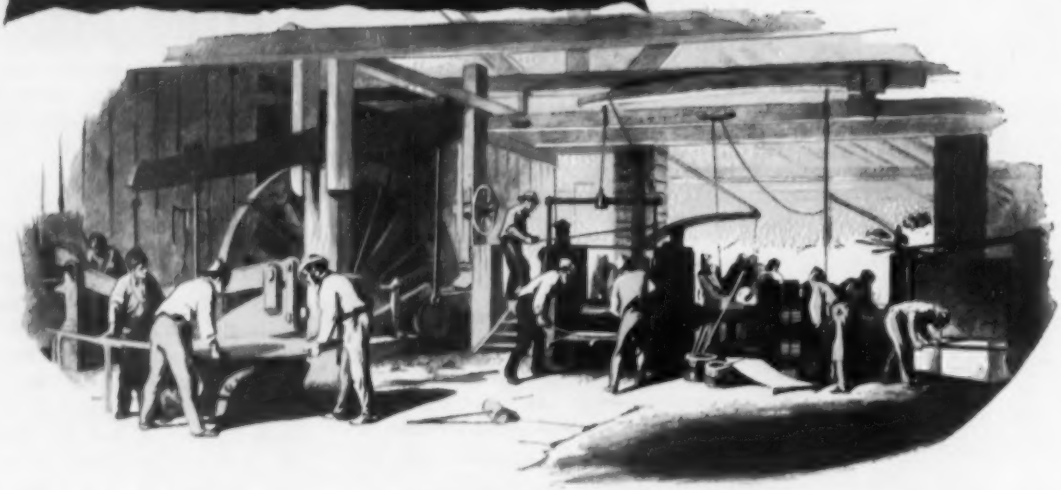
Atomic Energy Commission is inviting firms interested in manufacturing boral sheets—unclassified shielding material used in atomic energy operations—to attend a meeting at Oak Ridge, Tenn.

The meeting on Oct. 28 will completely cover the product including fabrication technology. Visitors will see the manufacturing process in operation.

AEC, which now makes all its own boral sheets, is attempting to establish an industrial source. Interested persons should contact D. C. Dowan, Oak Ridge National Laboratory, Oak Ridge, Tenn.

FAMOUS FIRSTS IN THE IRON & STEEL INDUSTRY

AMERICA'S FIRST IRON PLATE ROLLING MILL



Thirteen years after the War of 1812, Lukens Steel Company in Coatesville, Pennsylvania, was producing America's first rolled iron plates for boilers. Using tools and equipment that would seem exceedingly crude today, they rolled charcoal blooms into plates.

In 1825 the production of plates was limited to less than 34 inches width in this water-driven mill. Today, Lukens Steel Company has the country's largest plate mill, producing rolled plates up to 195 inches in width.

Another famous first in the iron and steel industry is BAKER'S MAGDOLITE, the original dead-burned dolomite. Ever since its beginning, BAKER'S MAGDOLITE has maintained a superior product. One that is always 5 ways better: Composition, Preparation, Strength, Economy and Quality. Order BAKER'S MAGDOLITE next time, and see for yourself how it delivers more uniform ingots, in greater numbers, and with less defective material.

5/33

ANOTHER FAMOUS FIRST

JEBCO PRODUCTS SINCE 1889

BAKER'S MAGDOLITE

The original dead-burned dolomite

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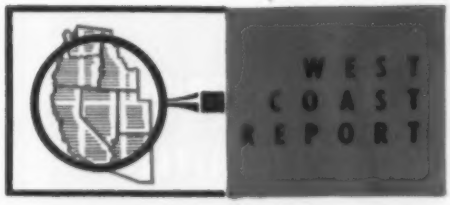


Come to Booming British Columbia

Province offers growing consumer and industrial markets . . . Big power boost fosters surge . . . Thirty-five companies search for new mineral deposits . . . Steel, nonferrous expansion set—*By R. R. Kay.*

◆ METAL producing and metalworking in British Columbia are on the march. What's behind this upsurge? Stepped-up hydroelectric power expansion: now 2.1 million hp vs 1.4 million in 1953. And there's still 15-20 million hp undeveloped.

Huge industrial development—plus a 35 pct population jump since 1945—guarantees a large, growing market for metalworking materials, products, and equipment.

Gas Flow Helps . . . Another source of power for industry: 300,000 cu ft of natural gas per day is coming to the province by 1956. Incidentally, most of the pipe will come from West Coast mills.

Spurred by cheap power and raw material needs, 35 Canadian, British, and U. S. mining companies are actively prospecting for new mineral deposits in Canada's Northwest.

Non-ferrous industry is expanding—chiefly, in electrometallurgical refining. Aluminum Co. of Canada's smelter at Kitimat expects to up raw ingot output from 91,000 to 380,000 tons per year by 1959. It will be the world's largest aluminum smelter. About $500 million will pour into the Kitimat development.

Plan Plants . . . A $270-million Frobisher Ltd. plan calls for $52 million in metallurgical plants and $218 million to develop 880,000 hp. Power would come from 4.3 million hp potential at Yukon River Water Basin.

By 1962, the firm expects to turn out per year: cobalt, 3.7 million lb; nickel, 80 million lb; iron and steel, 210,000 tons; manganese alloys, 160,000 tons.

Push Steel Too . . . Primary steel industry is in for big expansion, too. Ingot production from scrap will double. And rolling mills will hike output 30 pct by 1957.

One 60,000-ton-capacity plant making pipe and tubing (up to 4½ in.) got started in Vancouver. And five other iron-and-steel-product plants are expanding.

The province uses 245,000 tons of primary steel: bar, sheet, structural shapes, pipe, wire rod, wire, etc. About 80 pct is supplied by foreign countries and eastern Canadian mills. The rest comes from domestic primary steel producers.

Where Steel Goes . . . Big steel users now in the area: manufacturers of industrial machinery, bridge builders, structural steel fabricators, machine shops, foundries, and makers of wire goods, sheet metal products, hardware, tools, and cutlery.

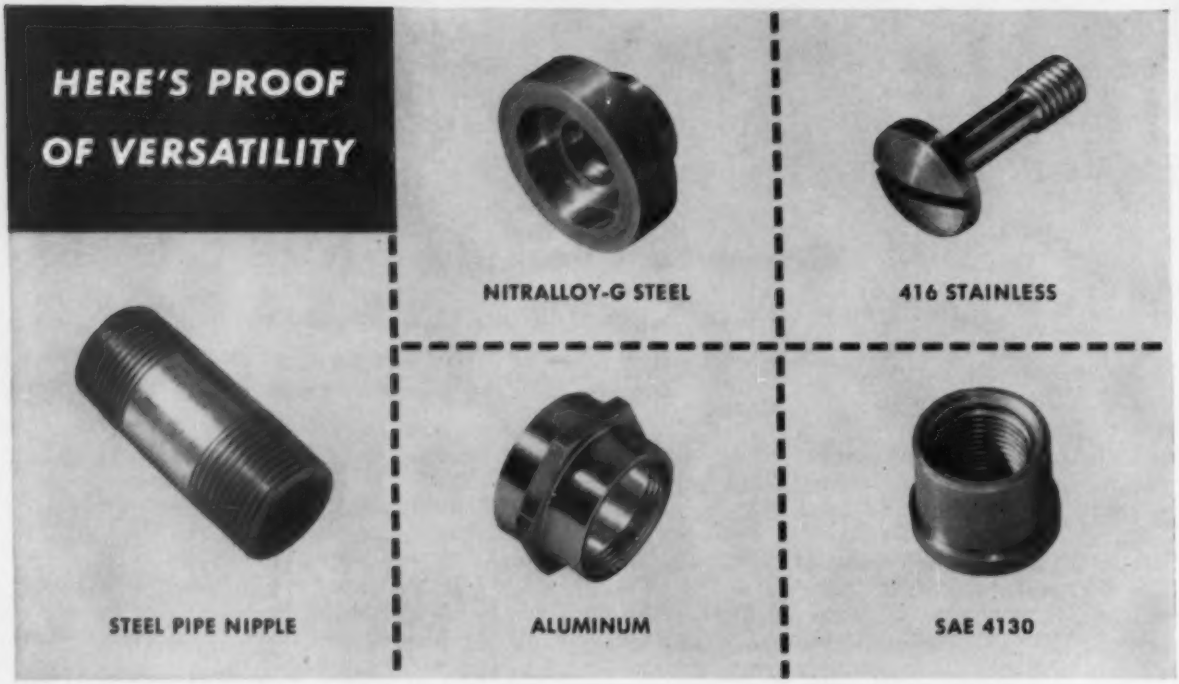
In these industries 350 firms employ 7000. Annual payroll: $27 million.

Manufacturers could well take a look at possibilities of making refrigerators, radios, electrical controls in British Columbia. The province imports $22 million per year in electrical appliances. And, it's still growing.

Industrial Expansion in British Columbia

INDUSTRIAL GROUP	ESTIMATED CAPITAL INVESTMENT ($'000)					
	1954			JANUARY-MAY 1955		
	Proposed	Underway	Completed	Proposed	Underway	Completed
Iron and Steel Products	.....	5,080	1,169.5	.....	4,322	6,290
Transportation Equipment	10,400	11,335	12,620	100	500	200
Non-Ferrous Metal Products	315,000	.....	275,000	180,000	45,000	.....
Electrical Apparatus and Supplies	.....	.....	60	.....	.....	200
Oil and Gas Pipelines	115,500	.....	.....	.....	.....	.....
Hydro-Electric Power	42,400	66,810	35,840	23,500	10,270	9,380
Other Manufacturing	229,100	186,327	62,373	30,095	193,877	1,630
TOTAL	708,400	269,552	387,062	233,695	253,969	17,700

SOURCE: Bureau of Economics and Statistics, Department of Trade & Industry, Victoria, B. C.



SUN DEVELOPS VERSATILE NEW CUTTING OIL FOR SCREW MACHINES AND JOB SHOPS

New cutting oil, Sunicut 5534, is moderately priced... gives excellent machining results on wide range of steels

New Sunicut 5534 is a non-emulsifying, transparent cutting oil specially compounded to give above-average machining results to operators who want a single oil to machine a large variety of ferrous metals.

Tests have proved that new Sunicut 5534 meets this demand for an all-purpose cutting oil. It is ideal for general screw machine and turret lathe work. It is also excellent for tapping, drilling, threading, and light stamping operations. In addition, new Sunicut 5534 can be used on many special machining jobs, both high and low speed, with metals ranging from B1112 to 4130 as well as free-machining stainless steels.

For complete information about new Sunicut 5534 and how it can help you reduce your oil inventories... lower your production costs... see your Sun representative. Or write SUN OIL COMPANY, Phila. 3, Pa., Dept. IA-11.

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INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY, PHILADELPHIA 3, PA.

IN CANADA: SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

MACHINE TOOL HIGH SPOTS

Government Halts Machine Buying

Move directly affects only about 30 builders . . . Viewed as administration attempt at pre-election budget balance . . . Industry worried if order becomes permanent—By *E. J. Egan*

◆ NEWS THAT the Defense Dept. has decided to hold up further purchases of long lead-time metalworking machinery for its mobilization reserve surprised U. S. machine tool builders at their annual meeting in New York last week.

Balanced Budget . . . Cutback was mentioned by Everett M. Hicks, vice-president and general manager of the Norton Co.'s Grinding Machine Div., and chairman of the Assn.'s Government Relations Committee. The move is viewed generally as part of the Administration's drive to balance the budget. Actually it directly affects only about 30 builders who make big, special machine tools.

Possibilities . . . But there are long-range potential repercussions that all builders can envision—and they don't like what they see. It all hinges on how long the stop-purchase order remains in effect. If the holdup is only temporary, until the government can soon show matching figures for incoming and outgoing funds, machine tool executives wouldn't be too concerned.

However, news of the cutback gave no hint as to how long the brakes might be left on. If the order sticks, builders say that these two possibilities can't be ruled out: (1) Congress might decide not to give the Defense Dept. any more funds to buildup its equipment reserve, since it apparently can't make up its mind what to do with the money it has now; (2) a sudden defense mobilization emergency would catch the U. S. woefully short.

Military . . . Apparently builders aren't the only ones disturbed by this turn of events. Word is that the three military services are shocked at seeing the rug suddenly pulled out from under their carefully planned procurement schedules. Office of Defense Mobilization director Arthur Flemming is also reported to be unhappy at this latest high-level Pentagon decision.

But regardless of Washington's attitude on machine tools, builders are delighted with the current and hoped-for future trend of civilian purchases. September new orders are estimated at about $61 million and shipments for the same period about $57.7 million, according to National Machine Tool Builders' Assn., headquarters in Cleveland.

Newly Elected Officers—National Machine Tool Builders' Assn.

President—Louis Polk, President and Chairman, The Sheffield Corp., Dayton.

First Vice President—Jerome A. Raterman, President, Monarch Machine Tool Co., Sidney, O.

Second Vice President—Alfred V. Bodine, President and Treasurer, The Bodine Corp., Bridgeport, Conn.

Treasurer—Perrin G. March, III, President, The Cincinnati Shaper Co., Cincinnati.

Feeling M-i-g-h-t-y Low?

IF GRINDING WHEEL PROBLEMS HAVE YOU DOWN IN THE DUMPS, DON'T MONKEY AROUND. Switch to CINCINNATI (PD) WHEELS. For *now* CINCINNATI Grinding Wheels offer POSITIVE DUPLICATION—a remarkable achievement in precision manufacturing and quality control that *can save you money . . . and increase your production.*

You'll start every day with a big smile and a spring in your step when CINCINNATI (PD) WHEELS are on the job. For through the CINCINNATI (PD) Manufacturing Process you are assured Positive Duplication of the original wheel *every* time you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

Yet CINCINNATI (PD) WHEELS *are priced no higher than ordinary wheels.*

So, let us help you see the bright side of life once more. Just contact us and we'll send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio. Remember—*only* CINCINNATI Grinding Wheels give you . . .

(PD) POSITIVE DUPLICATION

CINCINNATI
Grinding Wheels
A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

The Iron Age

SALUTES

John B. Arthur **He started making refractory materials right after the 1929 crash. His courage pulled a young company through the depression. His leadership brought large-scale growth and success.**

In 1930, Mexico Refractories Co. turned out the first of its "Better Refractories" firebricks. Founder John B. Arthur picked this year of black depression to strike out on his own.

Mr. Arthur had come to the town of Mexico, Mo., in 1914 on the strength of an ad for a bookkeeper. He took a job with a refractory brick company after a wheelbarrow interview, rose to the post of general manager and vice president. In 1929 he formed his own company.

Now he faced the problem of building a new organization at a time when established firms were losing ground and going under. The outlook was bleak but Mr. Arthur comes of hardy, resourceful stock. A lean man who looks a little like Will Rogers, he started with single tunnel kiln, moved slowly but steadily forward. In 1935, National Refractories Co. was organized as a marketing affiliate. Big Savage Refractories Corporation's plant at Frostburg, Md., was acquired in 1938. That same year, a silica brick plant at Van Dyke, Pa., was purchased and modernized. Canadian and Niles, Ohio, installations were added recently, bringing the daily capacity of the "Better Refractories" organization to more than 50 carloads of firebrick and refractory specialties.

With all this success, Mr. Arthur remains a man of simple tastes and ways. He has an easy, comfortable manner, takes a lively interest in community activities. In 1953, he gave land, cash and a building for a public golf course west of Mexico. Personal and company gifts have gone to youth programs and to the local hospital. Recently Mexico Chamber of Commerce presented Mr. Arthur with a plaque in recognition of community services.

Mr. Arthur was married in Decatur, Ill., in 1913—the year before he came to Mexico—and has two married daughters. Looking back now, he wonders if he would have had the nerve to go ahead with his company had he seen the depression coming. Looking ahead he sees some uncertainty in the atomic age but he is confident refractories will meet the demands of the future.

These typical properties show why Crucible 430 stainless was a good choice for the Murray worm drive clamp.

Tensile Strength — a. Room Temperature — 75,000 psi. b. At 1700F — 3500 psi

Yield Strength — 40,000 psi

Elongation — 30%

Hardness — 160 BHN

Endurance Limit — 40,000 psi

Creep Strength — Stress for 1% elongation in 10,000 hours at 1300F-1300 psi

Resistance to Scaling — Suitable for continuous service to 1600F.

the finest products wear a

STAINLESS *label...*

When you label a product *stainless steel* it means lasting dependability . . . good looks . . . and resistance to wear or corrosion.

That's why the Murray Corporation, Towson, Maryland, chose Crucible stainless for the worm drive hose clamps shown above. These clamps need the high strength, wear and corrosion resistance that only *stainless steel* can provide.

Stainless has other advantages, too. Its high creep and fatigue strength . . . heat resistance . . . and excellent workability may be just what you're looking for.

At Crucible stainless steels are *prescription-made* by steelmen with over a half century of experience in *special purpose* steelmaking. They'll welcome the opportunity to help you make the most profitable use of stainless for your products. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

PERSONNEL

GEORGE F. HABACH, elected vice-president, engineering, Worthington Corp., New York.

The Iron Age INTRODUCES

Arthur G. Bignall, elected president, **Lasalco, Inc.,** St. Louis.

Thomas C. Blake, appointed executive vice-president, **Federal Steel Corp.,** Dayton, Ohio.

Lloyd E. Schumacher and **Daniel T. Gundersen,** elected vice-presidents, **J. B. Rea Co.,** Santa Monica, Calif.

E. Robert Skelley, appointed vice-president, purchasing, **Smith-Scott Co., Inc.,** Riverside, Calif.

Max Ten Hagen, appointed manager of manufacturing, **Solar Aircraft Co.,** Des Moines, Iowa; **Earl D. Needham,** appointed manager, Material Div.; **Richard Bartel,** appointed assistant purchasing agent; **Herbert A. Lubke,** named purchasing agent.

Alfred A. Strelsin, elected chairman, board of directors, **McWilliams Dredging Co.,** N. Y.

Carl A. Drake, elected manager, Laminated & Insulating Products Dept., **General Electric Co.,** Coshocton, Ohio; **Leon N. Bress,** named consultant, Manufacturing Services, Schenectady, N. Y.

Guy B. Entrekin, appointed plant manager, manufacturing branch plant, **International Resistance Co.,** Burlington, Iowa.

George W. Newland, elected sales manager, central div., **Walworth Co.,** Pittsburgh, Pa.

Charles F. Euler, appointed Boston district manager, **Permacel Tape Corp.,** New Brunswick, N. J.

Frank T. Copeland, appointed merchandising manager, Pittsburgh region, Chrysler Div., **Chrysler Corp.; John V. Cooper,** appointed regional manager, Charlotte, N. C.; **Joseph R. Shoupe, Jr.,** named regional manager, Omaha.

Henry J. Erisman, named comptroller, **DeWalt Inc.,** Lancaster, Pa.

W. Lyle Sturtevant, appointed manager, district sales office, **Kaiser Aluminum & Chemical Sales, Inc.,** Kansas City; **Albert L. Copp,** appointed assistant manager, Exploration Dept., Oakland, Calif.

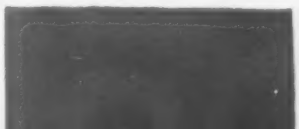
William L. Doepken, appointed assistant treasurer and credit manager, **Wheeling Steel Corp.,** Wheeling, W. Va.

James H. Smith, appointed salaried personnel director, **GMC,** Saginaw, Mich.; **Dale Wonus,** elected superintendent, Malleable Shell Dept., Century Foundry Div., Danville, Ill.

JOHN H. HARRIS, elected vice-president, planning, Brush Electronics Co., Cleveland.

WALLACE T. GRAY, appointed general works manager, Brush Electronics Co., Cleveland.

E. L. LANDEN, appointed commercial sales manager, U. S. Steel Corp., Harrisburg.



• Edited by GEORGE BLACK

CHEMICAL SHOW UNDERWAY

Advanced Know How will be the theme of the Cooper Alloy booth at the forthcoming Chemical Exposition in Philadelphia. Stainless steel castings, valves and fittings will be displayed along with the Vanton line of plastic and stainless steel pumps.

PUMP 65% HF & 40% H_2SO_4

Pumping 65% HF is tough enough, but when service requirements also include 40% H_2SO_4 the problem is really rough. An alert plant engineer found the answer by replacing two conventional pumps with one Vanton "flex-i-liner." He selected Model PX-60 with its Polyethylene block and ordered a gum rubber liner for the HF and a neoprene liner for H_2SO_4. Two trouble free plastic pumps in one! Details on request.

VALVES TO COMBAT CORROSION

75 questions and answers selected from Cooper Alloy Valve Clinics, cover materials, operations, service problems, installation and repair of stainless steel valves. This compilation, which originally appeared as a feature article in a leading Chemical publication is fast reading and good reference. Copies available on request.

PERSONNEL

Ralph E. Campbell, appointed district manager, Pittsburgh office, **SKF Industries, Inc.**

John J. Haher, named district manager, Industrial OEM Div., **Dayton Rubber Co.,** Dayton, Ohio.

Arnold Raines, appointed general manager, western div., **Norden-Ketay,** New York.

Thomas C. Harvey, appointed advertising manager, Sales Engineering Dept., **United States Graphite Co.,** Saginaw, Mich.

Charles S. Beshore, appointed director of purchases, **Automatic Transportation Co.,** Chicago.

Richard E. Deaux, elected director, product development services, **Servel, Inc.,** Evansville, Ind.

Charles E. Heilig, Jr., appointed sales manager "POP" Rivet Div., **United Shoe Machinery Corp.,** Boston, Mass.

Joseph Q. Benjamin, appointed assistant equipment sales manager, AC Spark Plug Div., **General Motors,** Flint, Mich.; **William L. Simpson,** appointed equipment sales office manager, AC Spark Plug Div.

Roy E. Carter, appointed superintendent of maintenance, **Green River Steel Corp.,** Owensboro, Ky.

Wesley E. Timmcke, appointed southern regional manager, **Warner Electric Brake & Clutch Co.,** Beloit, Wis.

David T. Smith, named sales engineer, stainless clad and composite steels, **Jessop Steel Co.,** Washington, Pa.

GEORGE E. TUBB, appointed manager-marketing, Small Aircraft Engine Dept., General Electric Co., Lynn, Mass.

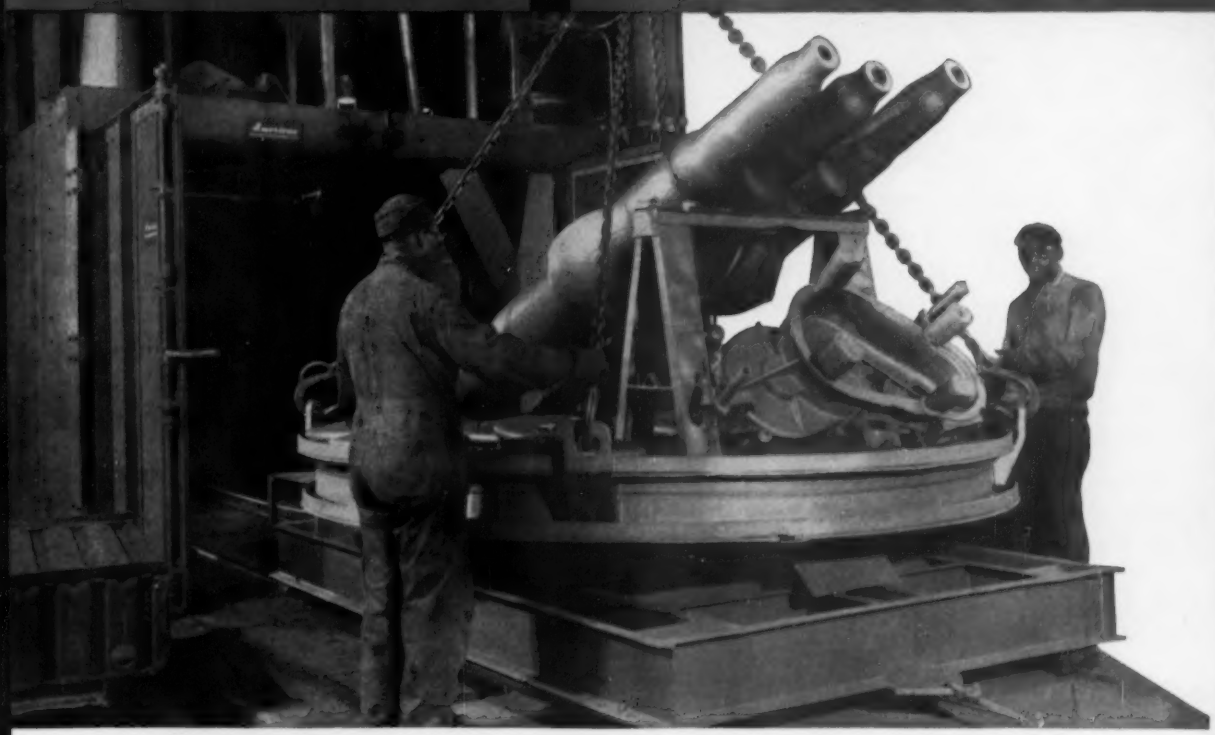
NAPIER B. CALDWELL, appointed sales manager, Boston plant, Joseph T. Ryerson & Son, Inc.

WILLIAM J. FATH, appointed production control manager, The Hydraulic Press Manufacturing Co., Mount Gilead, Ohio.

NEIL FRANKLIN MEREDITH, appointed production manager, Basic Refractories, Inc., Maple Grove, O., works.

cleaning costs slashed 40%

Wheelabrator* blasts the props from under cleaning costs



A Wheelabrator Car-Type Room, replacing a large airblast room, has reduced cleaning costs 40% for a prominent Chicago steel foundry.* It slashed 28 man hours daily in direct cleaning room labor. Cleaning large steel castings weighing up to 8,000 pounds each in just 12 minutes, it reduced cleaning time to a mere fraction of the airblast time required. This airless Wheelabrator Room provides improved surface cleanliness to reduce grinding and chipping costs. Blast the props from under your cleaning costs. Use a high-production, versatile Wheelabrator Room. Write today for Bulletin 854 which describes machine designs and includes actual job-study reports. Take advantage of Wheelabrator engineers' long experience in designing machines for any requirement.

*Name on request

Use genuine Wheelabrator Long-Lyfe wear-resisting parts

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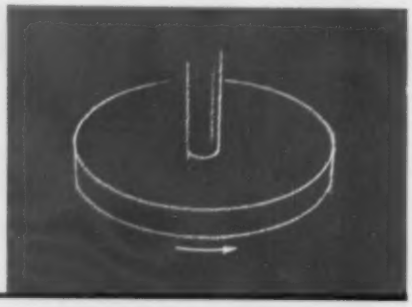
HOLCROFT and the ROTARY FURNACE



high production in small space

Production rates frequently bog down when floor space limitations prohibit large equipment purchases.

That's why—when the problem is heat treating—many companies turn to Holcroft for answers. Experience—imaginative engineering—versatility of products—all team up to provide answers.

For example, the solution to the problem above could conceivably be a rotary furnace: one with a single door for loading and unloading and a rotating hearth which carries the stock through the heat treat cycle. In this furnace, the hearth can be of a heat-resistant alloy or a refractory material. Or the furnace can be tunnel-type, grid-type, drum-type, or rotating retort. And, finally, the hearth can be suspended from above or supported from below.

Of course, this is only one of the many kinds of stock handling which might be suggested by Holcroft. Your problem probably will be different and Holcroft probably will have the answer.

Write today for a copy of Holcroft's illustrated book: "Blazing the Heat Treat Trail." It's bound to give you food for thought.

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PRODUCTION HEAT TREAT FURNACES FOR EVERY PURPOSE

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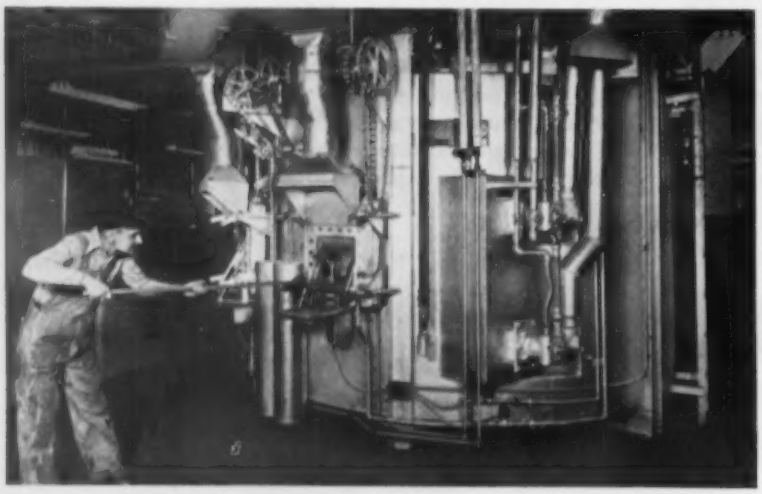
CANADA: Walker Metal Products, Ltd., Windsor, Ontario



Donald E. Stoops, appointed distributor sales manager, Transmission Div., **Clark Equipment Co.,** Jackson, Mich.

Arthur Konschak, appointed north central sales manager, **The Cleveland Ladder Co.,** Cleveland.

Percy W. Havenstein, appointed to engineering staff, **The Gas Machinery Co.,** Cleveland, Ohio.

Robert A. Atkins, elected overseas manufacturing director, **Burroughs Corp.,** Detroit.

H. C. Knutzen, appointed assistant district manager, Tulsa Plant, **Earl M. Jorgensen Co.,** Los Angeles.

Jerome F. Ferdinand, appointed sales manager, **Punch Products Corp.,** Niagara Falls, N. Y.

J. T. Lancaster, appointed plant manager, **Rycenga Manufacturing Co.,** Detroit.

William E. Goodere, appointed district sales engineer, **The Ingalls Iron Works Co.,** Houston.

William Henley, appointed manufacturers' representative, **Barry Controls Inc.,** Watertown, Mass.

Clay R. Brahm, named to sales staff, Metal Processing Chemicals Dept., **Pennsylvania Salt Mfg., Co.,** St. Louis.

Vincent B. Tivy, named chief application engineer, **The Foxboro Co.,** Foxboro, Mass.

William C. Wepfer, named exclusive representative, **Lewis-Shepard Products, Inc.,** Memphis, Tenn.

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Jal-Tread floor plate combines the strength and durability of high quality steel with a neat, distinctive checkerboard pattern scientifically designed for *safety*.

Whatever your application . . . in new construction . . . new equipment . . . or replacement jobs, Jal-Tread will assure you of these advantages:

Safe Footing—300 miniature squares per square foot—all of uniform height—provide maximum linear friction surface that protects you against lost-time accidents.

Easy Fabrication—The Jal-Tread straight line pattern simplifies welding, flanging, shearing, bending, punching, and drilling operations. Experience shows that Jal-Tread can be cold-formed on standard plate bending machines.

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For safe, long-lasting flooring always specify J&L Jal-Tread *. . . it's available at leading distributors everywhere.*

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Please send me my FREE copy of the new all-in-one catalog.

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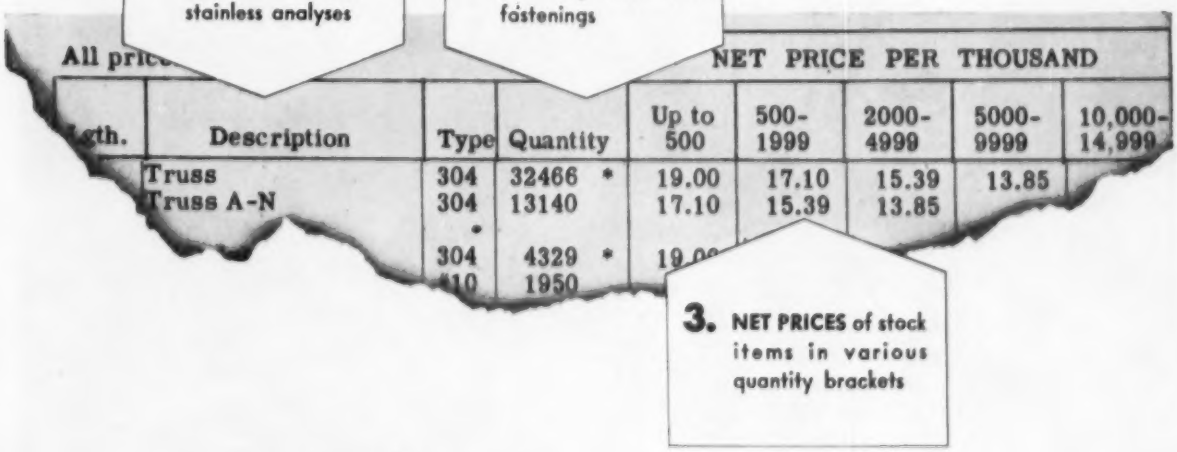
REVISED TWICE YEARLY—ALWAYS UP TO DATE!

For the first time, a catalog that gives *net prices* in various quantity brackets . . . PLUS actual quantities of more than 9,000 items and sizes *in stock!* All this in ONE catalog, all information for each item in ONE line . . . all the data you need *at a glance!*

1. **LISTING** of over 9,000 items and sizes in different stainless analyses

2. **Actual QUANTITIES** of America's largest inventory of stainless fastenings



3. **NET PRICES** of stock items in various quantity brackets

NEW LOWER PRICES!

Another *plus* . . . you'll find appreciable savings on many items listed in this new all-in-one reference catalog! One more reason to check Anti-Corrosive FIRST for stainless steel fastenings!

ANTI-CORROSIVE METAL PRODUCTS

ANTI-CORROSIVE
METAL PRODUCTS CO., INC.
CASTLETON-ON-HUDSON, N. Y.

But can you be sure it will work as well next month?

When your steel starts with ore from the same mines, reduced to iron in the same blast furnaces, refined to steel in the same open hearth furnaces, rolled on the same mills, by the same men, time after time, order after order . . . you can be certain that your steel is as uniform in quality as the best raw material sources, the finest steelmaking facilities and the most experienced steelworkers can make it.

INLAND STEEL COMPANY
38 South Dearborn Street • Chicago 3, Illinois

Sales Offices: Chicago • Milwaukee • St. Paul
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Principal Products: Sheets • Strip • Structural Shapes • Plates • Bars • Tin Mill Products • Rails and Track Accessories • Coal Chemicals

The Iron Age
FOUNDED 1855
TECHNICAL ARTICLES

Pushbutton controls—

Semiautomatic Line Speeds Aluminum Tank Production

◆ Production of auxiliary fuel tanks for aircraft moves on a fast cycle at Los Angeles' Pastushin Aviation Corp. . . . Operations include forming, welding and machining on three aluminum sections before final assembly.

◆ Special argon and Heliarc welding machines, pushbutton controlled, account for important time and labor savings . . . All of the major tank fabrication and assembly areas are tied together by an efficient conveyor system.

By JOHN SLOAN, Pastushin Aviation Corp., Los Angeles

◆ A SEMIAUTOMATIC, conveyorized fabrication and assembly line at Pastushin Aircraft Corp., Los Angeles, is tooled to produce external, jettisonable fuel tanks for military aircraft at a rate of more than 550 per day. Each tank requires 91 lb of aluminum and is completed in a fast cycle of forming, welding and machining operations.

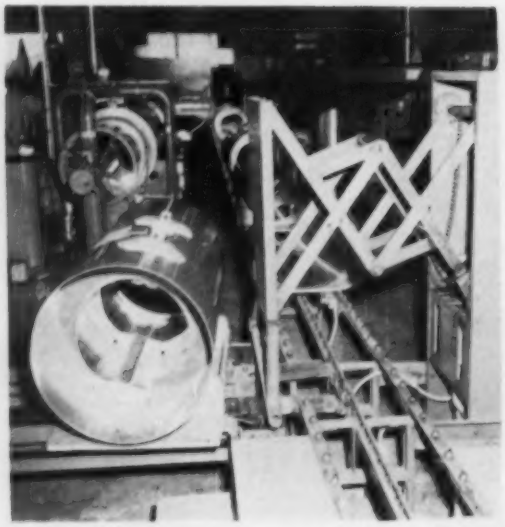
Extensive use is made of pushbutton controls for operating special welding machines, and of microswitches for positioning parts and for eliminating travel during forming operations. The assembly line in full production is operated by only 48 people.

Where line balance dictates, duplicate machines are installed for certain welding operations. The entire fabrication and assembly area occupies a space 40 x 100 ft, except for the presswork fabrication of detailed parts and the machining of small items.

Design of the underwing fuel tank requires the nose and tail sections to be preformed to conical shapes prior to bulge forming. The center section is originally rectangular, in a flat pattern, and is rolled into cylindrical shape.

To start the production cycle, the flat, preblanked skins of all three tank sections are brought, on pallets, to a rolling machine. The palletized materials are hoisted to working height on a foot-operated hoisting cart. Rolled shapes are then placed on individual dollies on the conveyor line and are removed and replaced

BULGE-forming the nose section takes two minutes with this special hydraulic machine.



CENTER section of tank is automatically pushed from floor conveyor to final assembly area.

as they progress down the line to the various work stations.

The nose, tail and center sections are each removed at one of several welding machines which make the longitudinal weld joints. Before welding, the mating edges of each part are wiped with acetone to remove dirt and grease. Then the edges are placed on a line welder which clamps them over a chill bar. The welding head moves on a track over the joint to fuse the two edges.

These automatic arc-welding machines are single phase, 300 amp, 50-60 cycle types. Each uses a water cooled torch in which the water is pump circulated through a line directly to the torch, and then carried away through a plastic tube which also surrounds the electric cable to the torch. Ceramic cups surround the pure tungsten electrodes.

Control argon gas usage

Argon gas is manifolded to each welding machine from a bank of 60 tanks placed in cascade. Two banks of tanks are installed, hooked to the same manifold line, but one is kept in reserve. When the full pressure of 2200 lb falls to a minimum of 150 lb, the reserve bank is brought into play and the first bank of tanks is renewed. Flow meters keep the argon gas usage at approximately 10 liters per minute.

The special automatic welding fixtures use governors to maintain a constant rate on either the welding wire feed or on the torch travel. Amperage to each machine is manually controlled. Each rheostat has a stop for maximum amperage, and in case of a line voltage drop, the operator can increase the current to approximately 15 amps above that normally required.

No wire feed is required for the longitudinal seam weld in each tank section. The job calls for close positioning of the skin edges with a minimum gap.

Following longitudinal seam welding, each tank section passes to a rolling machine that mashes the weld to approximately the thickness of the adjacent skin.

The center section of the tank then goes to a sub-assembly area where an internal joint-ring structure is inserted and expanded into place. This sub-assembly is positioned and clamped on a Heliarc welding machine which uses a wire feed to form a circumferential fillet weld between the joint ring and the center section skin.

Meanwhile, from the rolling machine, the nose and tail sections proceed to their respective bulge-forming machines. These units have hydraulically-operated segmented mandrels in which a wedge is drawn to expand the segments. Each nose skin requires four expanding operations on the mandrel, and the work is rotated slightly each time to reduce the flat spots that occur between the segments and show up as visible skin marks.

After the fourth expansion the marks are still visible on the skin's interior, but are not apparent to the touch on the exterior surface. A microswitch limits the first three operations to prevent overstretching; the fourth expansion gives each skin its exact final size.

The tail skin is formed in a similar manner, but care is taken to position the longitudinal weld in the area of least stretch during the expanding process.

Nose and tail skins are next moved to their individual trim machines. Skins are positioned in the machines and clamped by pneumatically operated half-rings which enclose the circumference at each end. A pneumatically expanded flycutter automatically moves into position and

trims the skin from the inside. After completing its cut, the flycutter retracts to its basic position; whereupon the turning heads stop, the clamps are opened up, and the nose or tail section is placed back on the conveyor.

An additional job performed by the nose section trimming machine is the automatic drilling of a fuel drain hole simultaneously with the flycutting operation. This drilling action is also pneumatically controlled.

Following trimming, the nose and tail sections proceed to machines which weld their cap ends into place, thereby closing the small opening in each workpiece. Welding wire feed is not used in this operation; instead, a narrow flange is spun on each nose and tail cap to provide material for weld fusion.

For the actual cap welding, each nose or tail skin is pneumatically clamped in place on the machine, and an air cylinder presses the corresponding cap into place. The torch lowers to welding position by pushbutton control, and a variable speed drive is used to revolve the assembly at an optimum rate.

Wire feed forms fillet

With its cap in place, the nose assembly moves to another machine where an extruded joint ring is welded to the inside of the skin. Because the extrusion is thicker than the skin, a governor-controlled wire feed is used to form a fillet weld. The wire is 3/32 in. in diam and contains 5 pct silicon. A fresh supply is assured by re-ordering wire approximately every week. Amperage for this operation is foot controlled.

Next operation on the nose assembly is a pressure test which uses liquid soap to detect leaks between the joint ring and the nose skin.

Each nose and tail assembly then passes on the conveyor line to a battery of specially designed horn presses. Here a filler cap hole, access hole and dive vent hole are pierced. A small clamp is spotwelded to the nose skin as the last operation before this end of the fuel tank is welded to the center section.

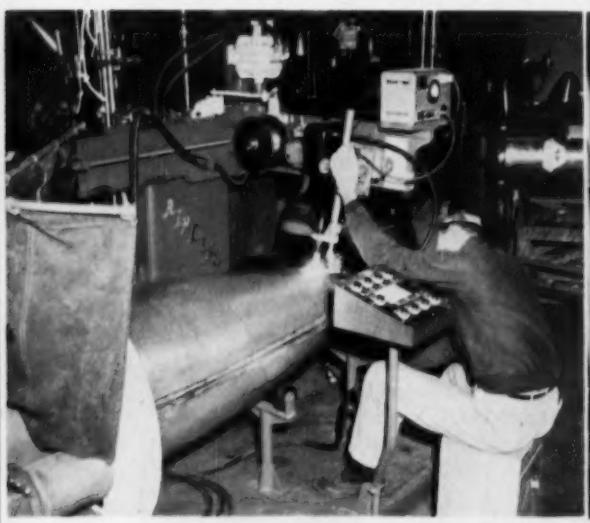
In the final assembly phase, a tail section and a center section are welded together at either one or two special machines. An expanding ring jigging device is placed at the aft end of the center section and the tail cone is positioned over it. Thus joined, the assembly is machine arc-welded. All of the machine functions are pushbutton controlled.

In this operation, the center section starts rotating before welding actually starts. This permits the operator to select an initial weld position where the tail and center section skins are pressed together so tightly that there is no gap. The arc then travels about one or one and one-half inches before the operator starts the wire feed. Amperage as wire feeding begins is at a pre-established minimum, and the operator increases it to the optimum current required.

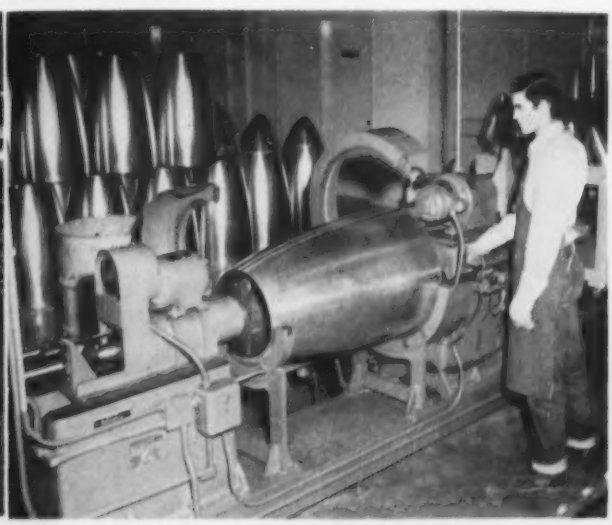
Wire feeding stops when the assembly revolves to the point where feeding began. A push button is used to increase amperage momentarily until the torch has traveled past the starting point, after which the amperage is decreased to zero. This machine also has a variable speed drive.

To complete the final assembly, a nose, center and tail section are brought together at the end of the conveyor line. Joining is accomplished by 16 bolts through the mating joint rings. An operator uses a pneumatic nut runner to do this.

The interior of each finished tank is then vacuum cleaned, and a final pressure test is applied, using liquid soap as a leak detector. Acceptable tanks are then crated for shipment.

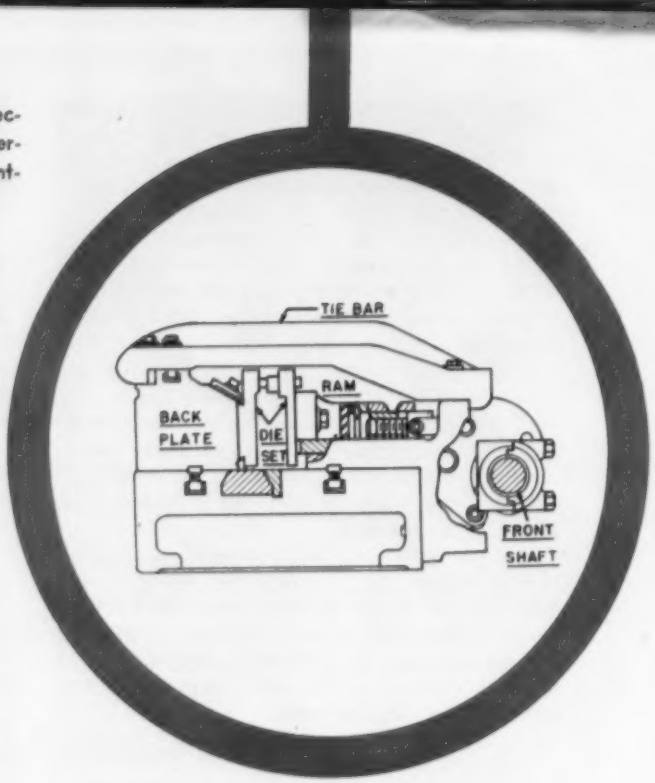


HELIARC machine welds tail cap to tail skin, replacing approximately six hand welders.



TRIM machine locates and trims both ends of nose skin to correct diameter and length.

SCHEMATIC cross-section of method for operating the ram and mounting the die set.



Uses coiled strip—

By W. G. PATTON, Engineering Editor

Versatile Multiple Slide Equipment Forms Many Parts

◆ Forming can be spread over as many as four dies to lengthen die life, simplify die maintenance and repair . . . Strip utilization is excellent . . . Machines require less floor space and fewer man hours per piece produced.

◆ Working on coiled strip stock, multiple slide forming equipment at Buick produces a variety of metal clip designs . . . Output ranges from 80 to 100 clips per minute, and no secondary operations are required.

◆ FIVE DIFFERENT METAL CLIPS, required in large quantities for passenger cars, are being produced by Buick Motor Car Div. on a single U. S. Multi-Slide machine.

Production rate is 80 to 100 clips per minute. In addition to greater versatility and at least double the production rate of a progressive die setup, floor space and man-hour requirements per piece are substantially less than the requirements for other manufacturing methods.

Safety stops prevent damage to the machine in case of jamming. Die life has been excellent, exceeding 750,000 pieces for some parts. This manufacturing method also greatly increases the efficiency of materials utilization. All of the strip metal is used for some of the clip designs.

The versatile forming unit, in most instances, replaces two or more conventional presses. Secondary operations are not required, which eliminates unnecessary handling.

Tooling can be changed for most parts in 4 to 5 hours. Eventually, it is expected that nearly all Buick clips, including several of complicated design, will be made on multiple slide equipment.

To produce one typical clip, the machine is

equipped with a die head and two steel welding tips. This operation forms the metal for projection welding. At the next station, there is a cut-off slide as well as the form tools required to complete the clip.

Describing the machine in more detail, there is a shaft system around four sides of the bed. These shafts are joined at the four corners by means of miter gears. Power is applied to the camshaft system through driving gears. Cams, mounted upon the continuous shaft system around the four sides of the machine bed, actuate the various rams and slides.

Tooling works horizontally

In contrast to most presses into which work is fed horizontally (lying flat), strip steel is fed into the multi-slide machine in a vertical position (on edge). With the stock on edge, most tooling operates in the horizontal plane.

As many as four rams can be operated simultaneously, if desired. A die assembly is mounted on each ram. This tooling is roughly comparable to the dies used on standard punch press equipment. However, in addition to four forming slides, slides are also employed to provide counter pressure to that exerted by the rams. The accompanying schematic diagram shows the method of operating the ram and the mounting of the die set to a vertical plate member.

The fact that the rams can be used from either direction often facilitates die design and lessens die maintenance. Under some conditions, two rams can be used in opposing positions, permitting both the punch and the die to move away from the stock line. This permits free movement of material that may have undergone a drawing or pre-forming operation.

For a typical clip-forming operation, a stock coil is mounted on a horizontal reel at the entrance end of the machine. A loose loop of strip material is maintained between the real and the feeding mechanism of the machine. The reel is actuated intermittently by a mercury switch control.

Strip is fed into the machine by an eccentric-operated slide feed mechanism. The strip is first drawn through a stock straightener. The feed block reciprocates on hardened and ground slide rods between adjustable positive stops. Accuracy of the feed can be controlled within $\pm$ 0.001 in. A cam-actuated stock check prevents any movement of the material after it has advanced to the proper pitch length.

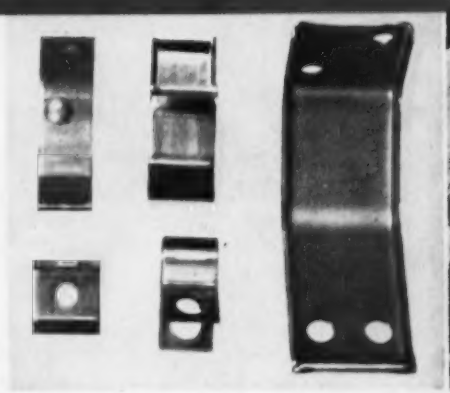
After straightening, strip is oiled and cleaned before entering the machine.

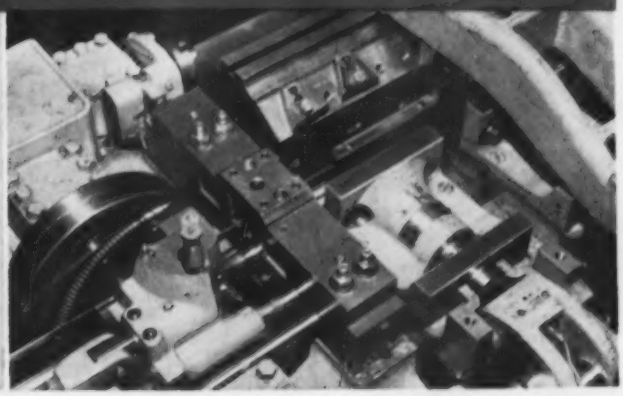
In the ram, the die members are fastened to the die shoe. The punch members are fastened

Right: **STRIP steel coil is mounted on a feed reel at the entrance end of the forming machine.**

Below: **TYPICAL clips formed from strip steel on the versatile, automatic multiple slide machine.**

Below-Right: **DIE SET here is actuated by a cam-operated ram to do preliminary forming on the strip steel.**





Use of sectional dies provides minimum clearance and draft in die openings—an important factor in prolonging the life of dies.

to the punch holder. The die shoe is bolted to a vertical plate or bolster at the rear of the machine bed. The punch holder is secured to the cam-actuated ram slide which normally operates from the front of the machine.

After required die operations are performed, the blank is separated from the strip. This may occur in the die or by a separate cam-actuated cutoff slide, mounted between the final ram position and the forming slides. After separation, the partially formed strip is picked up by the remaining forming tools.

Shafts undisturbed during setup

A standard forming unit includes a left hand, right hand and front and rear slides. Each slide is actuated by a split-type cam. Cams are mounted on carriers, which, in turn, are fastened to the horizontal machine shafts. It is not necessary to disturb the shaft system during setup.

To prevent damage to the machine, an electrically-operated brake is used. Control is through two micro-switches. As the end of the material strip enters the forming position, it contacts an arm on a micro-switch. At the same instant, a cam on the rear shaft actuates a second micro-switch. If the material fails to contact the micro-switch located under the stripper head, the clutch disengages automatically and the brake is applied. The machine stops instantly. This prevents possible damage, either to the tools or the machine.

Use of a clutch system permits smooth starting of the machine. Flow of power is even and operations are timed and distributed so they do not all occur simultaneously. The result is fast, smooth production at a high rate of speed and with outstanding tool life. According to Buick tool engineers, die maintenance expense with this equipment has been substantially less than that experienced when conventional press methods are used.

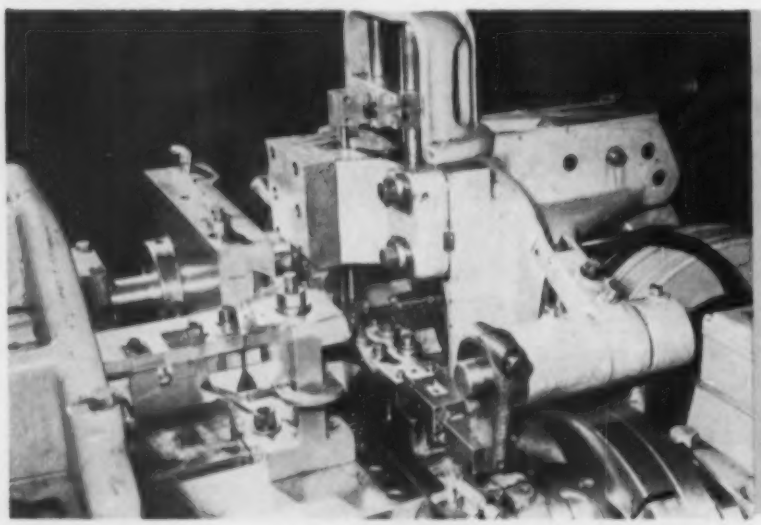
Get longer die life

It is standard practice to use sectional dies at Buick. This permits minimum clearance and draft in die openings. Minimum draft is an important factor in extending die life.

Since several rams can be used simultaneously on the multiple slide machine, work load can be advantageously distributed. Also, if desired, work can be spread out between as many as four dies. Use of separate dies facilitates die changes and repairs.

Form tools are generally made in one piece and mounted on a tool block. Where wear is excessive, inserts can be employed. Most such tools are made of high carbon, high chromium steel.

Several of the clips produced on this multi-slide machine previously required secondary operations and handlings. Strip materials up to ¾ in. width are now being processed but plans call for extending the use of these machines to wider materials and more complicated parts.



PARTIALLY-formed blank is separated from the strip, formed here by the remaining tools.

PART II

By A. M. SABROFF,
Project Leader
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Titanium Extrusion A New Fabricating Technique

Practical pointers—

◆ Successful extrusion of titanium implies good surface finish . . . A Bentonite lubricant of proper consistency proved most effective in producing a scratch-free surface.

◆ Die wear—a major problem—was checked for a variety of commercial tooling materials . . . Carbide dies gave best results, proved most efficient . . . The proper combination of die and lubricant produced smooth, scratch-free bars 6-9 ft long.

◆ SUCCESSFUL EXTRUSION of titanium is now a reality. Its accomplishment required the careful review of at least four principal factors. These were 1) extrusion temperature, 2) die design, 3) lubrication, and 4) die material (THE IRON AGE, Oct. 27).

Lubrication for titanium extrusion presented a major problem. Although some commercial lubricants have been used for extrusion of other metals, few have been developed expressly for extruding titanium.

In the extrusion temperature and die design studies, a commercial lubricant mixture consisting primarily of aluminum grease and flake graphite was applied to the dies and press container. This lubricant was compounded as a low-viscosity mixture with a National Lubricating Grease Institute consistency rating of No. 0.

When applied to hot tool surfaces, the lubricant became very fluid and collected on the bottom of the container and the bottom part of the die. The inability of the lubricant to "stay in place" resulted in pickup on the die face which was consistently heavier at the top part of the dies.

The poor surfaces obtained in these tests pointed to the need for better lubricants. Studies of the effect of lubricant composition on surface quality were conducted on billets of the Ti-3Mn-complex alloy extruded at 1600°F.

Four experimental lubricant mixtures were compounded. Three of the four contained calcium grease together with either 1) 35 pct flake graphite and 5 pct mica, molybdenum disulphide and mica, or flake graphite, 2) 25 pct molybdenum disulphide, and 5 pct mica additives. The fourth mixture, which did the best job, contained 25 pct flake graphite, 15 pct modybdenum disulphide, and 5 pct mica in a Bentone grease.

Part I of this article covering 1.) extrusion temperature, 2.) die design and 3.) effects of extrusion temperatures and heat treatment on mechanical properties, appeared in last week's issue.

FIG. 1—Etched section of skull of Ti-3Mn-complex billet showing nonuniform metal flow.

The consistency of the lubricants was increased to a NLGI No. 2 grade. This decreased "running" on the hot tool surfaces and provided a more uniform coating on the tools. This effect resulted in reduced pickup on dies and improved bar finishes.

Measurements of extrusion pressure showed that the No. 4 lubricant was also more effective in reducing extrusion pressure.

Die design helps

The dies used in these studies had a conical-entry angle of 130 degrees, a ½-in. radius at the die opening, and a 3/16-in. bearing length. This design, based on the results of the earlier tests with conical dies, was found to produce optimum flow conditions, require minimum pressure, and provide better lubrication at the die opening.

Generally, the flow of metal into the die opening was uniform from all parts of the billet. In several cases, however, a part of the billet appeared to be restrained from flowing through. This produced nonuniform metal flow. As a result, the outer skin of the billet was enfolded toward the center of the billet, and a layer of lubricant and oxide was trapped within the billet as is shown in Fig. 1.

Tool steels used

This flow condition can be caused by 1) insufficient lubrication on part of the die, 2) poor alignment between the conical die and the container, or 3) large temperature gradients within the billet.

The condition did not have any noticeable effect on the surface finish or soundness of the bars extruded in this work because the defect is retained in the skull with short billets. But it would produce surface seams and interior laminations in bars extruded from longer billets.

The dies used in studies of extrusion temperature and die design were made of a 5 pct chromium, hot-work tool steel. This steel, heat treated to a hardness of Rockwell C 45-50, is commonly used for aluminum extrusion dies. It can not withstand the high temperatures involved in extruding titanium. Complete destruction of the die generally occurred after one extrusion at temperatures above 1400°F.

Die wear was slight in the tests on unalloyed titanium. However, the surfaces of the dies were "annealed" during extrusion to a hardness of less than Rc 20 in several instances and the dies could not be reused. With the higher pressures required to extrude the Ti-3 Mn-complex alloy, the dies were severely eroded at the die opening. This can be seen in Fig. 2.

Dies made of a 9 pct tungsten-3.5 pct chromium tool steel were used in the lubricant evaluation studies. This material proved to be more resistant to the high temperatures involved. Less softening

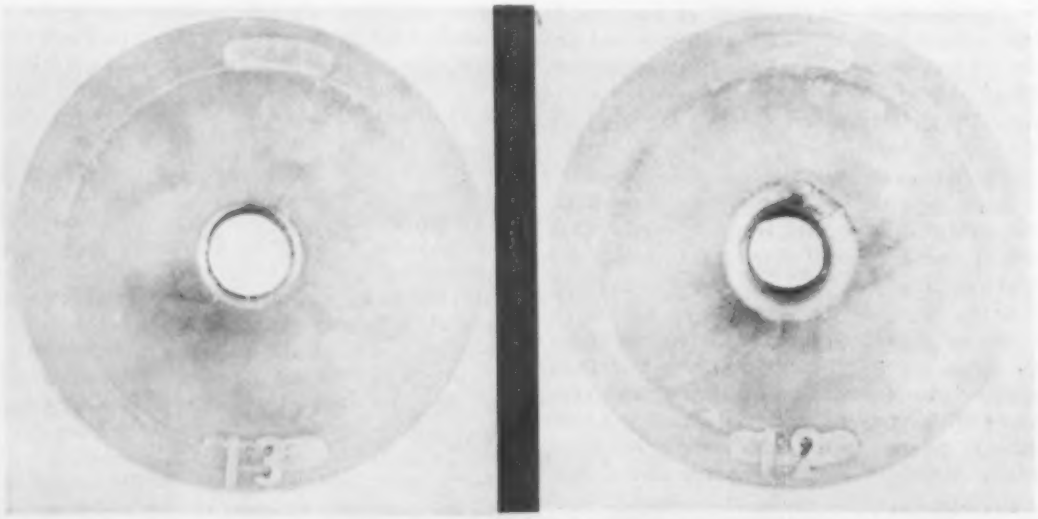


FIG. 2—How 5 pct chromium tool steel dies appeared after extrusion of one Ti-alloy billet.

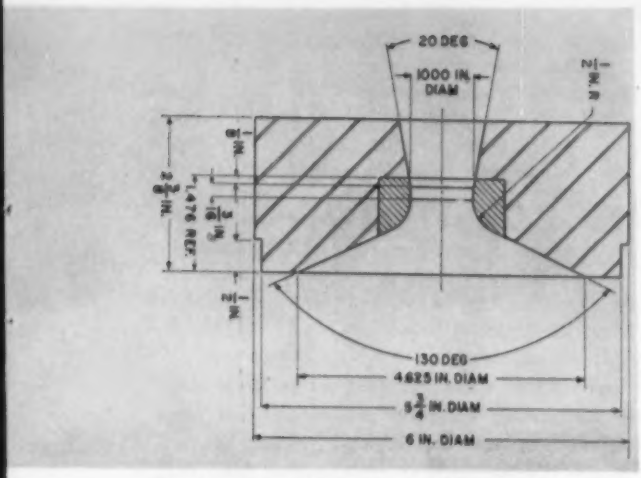


FIG. 3—Basic die design used for evaluating the various experimental die materials.

occurred than with the 5 pct chromium tool steel at equivalent temperatures. Where close dimensional tolerance is required, however, this material would not withstand continuous use.

Nine commercial materials, including cemented titanium and chromium carbides, cobalt-base alloys, a sintered tungsten-base alloy, and a high-tungsten tool steel, were chosen for evaluation as extrusion die materials. All materials were used in the form of inserts for dies of the design shown in Fig. 3. Die cases were made of the 9 pct tungsten-3.5 pct chromium tool steel hardened to Rc 50.

Billets of the Ti-3 Mn-complex alloy were extruded at 1700°F in these studies. Lubricant No. 4 was applied to the container and dies just before extrusion.

Tests were conducted on three commercial grades of titanium carbide. Five billets were extruded through each die. After 3 or 4 extrusions slight surface cracks occurred in the inserts.

The dimensions of the inserts, however, were not affected. Nor was there visible evidence of die wear. Varying amounts of titanium pickup occurred during these tests. But the pickup was not very adherent and could be easily removed without damage to the original surface of the insert.

Seven billets of the same titanium alloy were extruded through a chromium carbide die.

Slight surface cracks developed in the die land after the fourth test, but dimensional tolerance was maintained to within 0.001 in. after the seventh test. Again, the titanium pickup was not adherent and the original surface finish of the insert was retained.

Three grades of cobalt-base alloys were tested, ranging in hardness from Rc 44-59. These alloys represented the compositions generally used for applications requiring high-temperature abrasion resistance. Four billets were extruded through each of the dies. All three of the inserts developed cracks after the second extrusion. These were enlarged as extrusion continued. Pickup was very adherent and difficult to remove.

The sintered tungsten-base alloy contained small amounts of nickel and copper, added to this material to improve machinability. After machining to size, the insert was carburized to increase surface wear resistance. After extruding three billets, measurements of the die land indicated that the insert had upset, causing the die land to become tapered.

As a result, the bearing length became too short to even out the slight differences in metal flow that occur within a billet being extruded. The bar "chattered" as it extruded. This material exhibited excellent resistance to seizing by the titanium. Dimensional tolerance, however, was destroyed by the "chattering" effect.

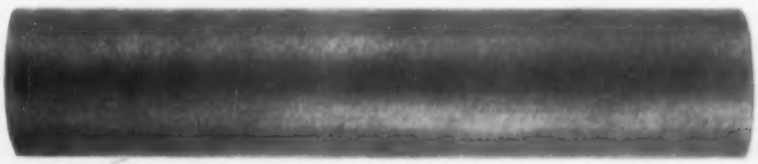
Billets were extruded through a high-tungsten tool steel die containing 14 pct tungsten and 3.5 pct chromium. A slight amount of wear increased the inside diameter of the insert by 0.003 in. Pickup was heavy and adherent, but no cracking was observed.

Carbides work best

Generally, the best surface finish was obtained with the carbide dies. These materials also exhibited the best high-temperature abrasion resistance and the least tendency to be seized by the titanium.

Since variations occurred in the surface finish of the bars extruded with a given die, it was evident that the lubricant was still a factor in getting a high-quality surface finish. It was found that the No. 4 lubricant compounded to a NLGI No. 4 consistency was too thick to apply a light, evenly distributed coating on the tools. Excess lubricant, with the accumulation of its oxidation products, produced a heavily scratched surface.

Reducing consistency back to NLGI No. 2 resulted in a greatly improved bar surface. A light precoat on the tools, followed by another light coating just before extrusion, gave the best results. With the carbide dies, smooth bars free of scratches and defects over their entire length of 6-9 ft were obtained by this procedure.



Typical as-extruded surface finish obtained on 1 in. diam bars of the Ti-3Mn-complex alloy under optimum conditions.

Paired with steel—

Nylon Rolls Prevent Scratches in Forming Prefinished Strip

◆ Matching pressure rolls of nylon and steel answer the problem of achieving scratch-free surfaces when prefinished strip is roll formed . . . Nylon rolls, machined from stock shapes, cost 40 pct less than hardened steel ones.

◆ Roll pairs of nylon and steel, set up for progressive contouring, will form prefinished, thin gage stainless, brass and aluminum . . . Here's how one firm uses the technique on prelacquered brass strip 0.035 in. thick.

By K. G. HARMS, Technical Service Mgr., The Polymer Corp. of Pennsylvania, Reading, Pa.

NYLON rolls are machined quickly from stock tubular shapes on a regular metalworking lathe.

◆ ONE OF THE MOST troublesome problems in roll forming prefinished metal strip is that of avoiding damage to the surface during the forming process. Standard procedure has been to form the strip between hardened steel rolls, but this tends to mar those decorative coatings and finishes that scratch easily.

However, by using matched pairs of nylon and steel pressure rolls, it is possible to form prefinished, thin gage metal strip without harming the coated surface. Both types of rolls, of course, are contoured to produce the desired profile shape in a progressive manner.

Tests indicate that nylon rolls can be used in forming stainless steel strip up to 0.045 in. thick; copper and brass up to 0.060 in. thickness; and aluminum strip up to 0.090 in. thick.

As a case in point, one firm uses matching nylon and steel rolls to form 0.035-in. thick lacquered brass at the rate of 60 to 100 fpm. The strip has a hardness of 40-50 RT, yield strength of 16,000 psi, and grain size of 0.02 mm. The metal is roll formed into decorative trim used to frame the glass panes in television sets.

Originally, the profile form was made first on uncoated strip. Then the required parts were cut to length and lacquered, but coating these short lengths was found to be quite expensive.

In order to reduce costs, the company tried to form prelacquered strip between steel pressure rolls. But the coated brass scratched as easily as cigarette foil.

By switching to matched pairs of nylon and steel pressure rolls, the company has been able to fabricate successfully more than a million feet of lacquered brass strip with negligible rejections. This is in contrast to its inability to form any of this material satisfactorily when only the steel rolls were used.

Total cost of the nylon rolls—including materials, labor and installation—is 40 pct less than the cost of the steel rolls.

As shown in the accompanying sketch, a coil of prelacquered brass strip is fed continuously into the tandem roll setup. In each pair of rolls, the top one, with the concave profile, is made from Polymer Corp.'s Polypenco FM 10001 nylon. The bottom roll has a convex profile and is made from hardened steel.

The profiles on the nylon rolls are obtained simply by turning stock shapes on a lathe. Proper contours on the matching steel roll sections are achieved by grinding.

When the nylon-steel roll forming setup is in operation, an air stream at both the entrance and exit ends of each pair of rolls blow away

any dirt that appears at the interface of the nylon and the lacquered strip surface.

The nylon rolls are approximately 4 in. OD and 3 in. ID. They are machined from tubular bars of the stock nylon material. The inside diameter of the roll tube is machined slightly smaller than the outside diameter of the metal hub to which it is fitted.

To insure a tight fit, the nylon material is heat-expanded to a point where it just will slip over the metal hub. Added non-slip fastening is accomplished by the use of nylon inserts or "dutch pins." It is also essential that each nylon roll be end-supported with steel plates. This reinforcement prevents any tendency of the nylon to extrude endwise under forming pressure.

Nylon's resiliency—its ability to conform to shape—plays a vital part in this roll forming operation. The nylon rolls act as female dies with the matching steel rolls. To take advantage of the "conformance" property of the nylon, each roll is allowed 0.010 to 0.015 in. of lateral play. This prevents excessive wear at any one spot in the roll. However, where very sharp bends are made in the strip material, the nylon rolls are not allowed any play or lateral movement.

Resiliency saves machining

This ability of nylon to conform to slight contour variations was pointed up in still another way in the process of forming the glass-pane frames for television sets. For added economy, the manufacturer switched from a fine-grain brass strip to a less expensive coarse grain variety. To obtain the desired shape with the cheaper material, the steel rolls had to be reground. But because of the resiliency of the nylon rolls, they did not require re-machining.

After the lacquered strip is formed by the progressively contoured nylon-steel roll pairs, it must go through a take-off machine and be cut to length. But there is always a sideways camber when the formed strip leaves the last roll. The camber is usually unpredictable and it varies continually. Accordingly, the shearing unit is set up on rollers so it can move in the direction of the camber.

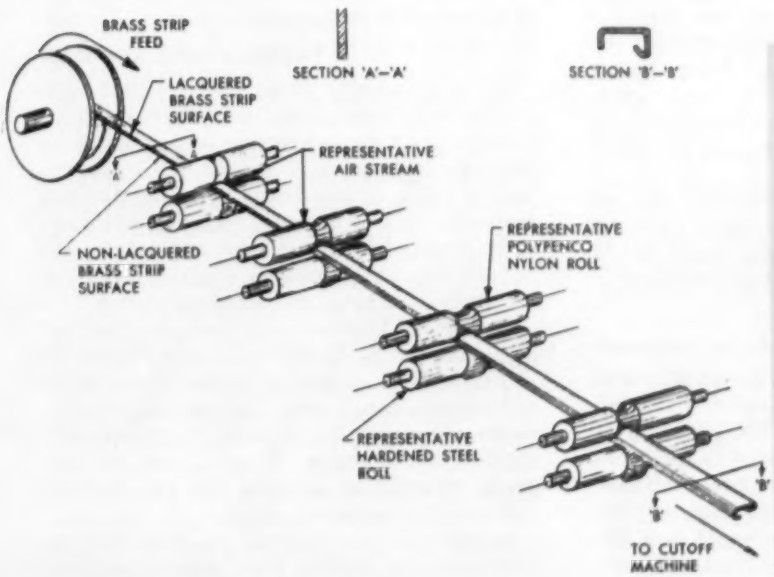
Use nylon guiding device

It is imperative that the formed strip should enter the shearing unit in perfect alignment for the cutting-off operation. This is accomplished by means of a guiding device called a "horn." Initially, these "horns" were made of metal, but they scratched the lacquered brass surface in much the same manner as the hardened steel roll sets had done. Nylon was substituted for metal in this guiding device and immediately proved to be the successful solution to the problem.

Nylon serves still another cost-saving function in the manufacture of these decorative television frames. It is used as a die material for stamping prelacquered, ornamental brass corner pieces that hide the joints made by the vertical and horizontal frame sections. The punch is made of tool steel, but the nylon die prevents any scratching of the prelacquered brass.

The die was made from ¼ in. thick nylon slab. It was screwed into place in a metal base for maximum rigidity. The stamping press exerts 20,000 psi pressure and uses a 2 in. stroke to produce 1800 parts per hour. Impact on the nylon die is 5000 ft-lb per second.

Thus, in roll forming and stamping this prefinished material, nylon was the key to a better product, more efficiency and lower cost.



SCHEMATIC of progressively contoured nylon and steel rolls forming prelacquered brass strip.

Thickness ratio of 125:1—

Seam Welder Joins Thin Stainless Into Leakproof Assembly

◆ Conventional welding methods and equipment couldn't handle this all-stainless welding job . . . Circular sheets only 0.005 in. thick had to be rim-welded to a ⅝ in. thick block . . . And the assembly had to be leakproof under pressure.

◆ A special resistance welding machine turned the trick . . . It's rigidly built and equipped with precision controls . . . It works fast, makes an inside weld in 20 seconds; an outside face weld in 30 seconds . . . Setup takes about 5 minutes.

◆ A SPECIAL RESISTANCE welding machine had to be built for a difficult welding job on the stainless steel diaphragm assembly of a differential pressure and flow transmitter. The delicate instrument, made by the Foxboro Co., Foxboro, Mass., is used to measure the rate of process flow in pipelines.

Heart of the transmitter, the pressure-sensitive diaphragm assembly, is built in the form of a sandwich. Principal parts are two type 316 stainless diaphragms, each 0.005 in. thick; and a solid stainless steel back-up plate, approximately ⅝ in. thick, that fits between the two diaphragms. The thin spaces between the diaphragms and the back-up plate are solid-filled with silicone fluid.

The diaphragms and the back-up plate are circular in shape. A concentric series of grooves or convolutions in the diaphragms match and fit into identical convolutions that are machined in the back-up plate.

Had to be leakproof

It was apparent in the early design stages of the diaphragm assembly that a difficult welding operation would be involved. The outer lip of each diaphragm had to be welded to the back-up plate in a continuous, leak-proof manner around the circumference. Soundness of the welds was essential since they would bear the full brunt of operating pressures (up to 2000 lb) introduced into the final transmitter assembly.

Experiments were made using inert gas welding, but results were poor. Since the diaphragms had to be heated above the melting point, fusion welding annealed the metal and destroyed certain essential spring characteristics. Carbide precipitation also developed, which reduced the corrosion resistance of the stainless metal. Furthermore, holes were frequently burned in the diaphragms by this process.

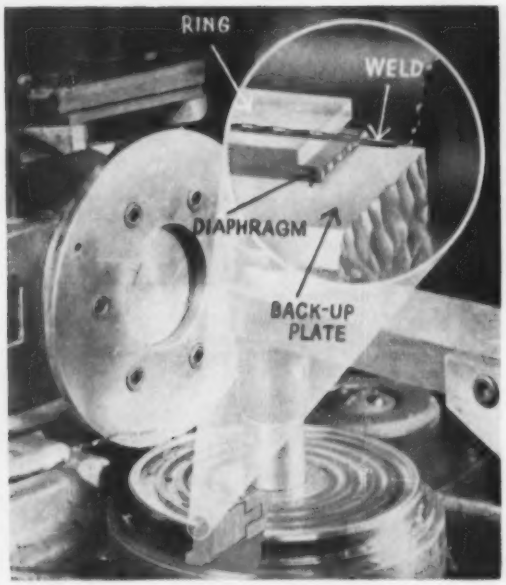
Thickness ratio was 125:1

Primary difficulty in the way of a good welding job was the thickness ratio involved. With a 0.005 in. thick diaphragm section and a back-up plate about ⅝ in. thick, the ratio was approximately 125:1. It was finally apparent that this factor, in view of the severe service conditions to be imposed on the average instrument, was not likely to be satisfied by conventional welding methods or by conventional equipment.

Therefore, Foxboro engineers and welding specialists at the Thomson Electric Welder Co. of Lynn, Mass., worked out a special resistance welding machine. To meet the exacting requirements of the job, the machine is exceptionally rigid in construction. It makes use of high grade components, accurate jigs and fixtures, and precision control apparatus.

Exceptional care is taken in preparing the workpieces for welding. Rigid dimensional con-

PLATES and diaphragms ready for welding on the special machine . . . Control panel in background.



DIAPHRAGM being welded to back-up plate. Inset pictures weld detail, magnified 20 times.

trol is maintained, with some of the control equipment being regulated by precision instruments. Surface preparation is also critical; multiple finishing operations are performed to prevent any variation in the contact resistance of the parts to be welded.

The machine operator must be highly skilled, and operating conditions must be carefully set up and maintained according to specially calculated formulae. Adjustments made by the operator involve (1) pressure of the seam-welding wheel, (2) current applied, (3) speed of the motor that revolves the work, and (4) the heat-cool cycle.

When properly adjusted, these machine controls permit spacing of the welding nuggets so that they produce a precise amount of overlap. Object is to avoid excessive buildup of weld in any one area, and also to avoid leaving unwelded spots that would permit leakage.

Once the adjustments are made for a particular welding operation, the machine will produce an inside weld (45 nuggets) in approximately 20 seconds; and an outside face weld (118 nuggets) in about 30 seconds. Setup time to shift from one type of weld to another takes no longer than five minutes.

Several design refinements in the diaphragm assembly were made later to aid the welding operations. One involved machining the top and bottom rim faces of the stainless back-up plate to provide a 0.006-in. high projection on each face where the circumferential welds are made. The full height of these projections is not burned down in welding because the heating is practically instantaneous.

Ring prevents warping

To further protect the diaphragm metal and prevent warping in the critical welding stage, a metal ring is now tack welded to the outer rim of each diaphragm. And for the same reasons, a metal disk is tack welded over the center of each diaphragm where the latter part is to be firmly welded to a central hub section, or spacer. The seam welding wheel travels on this rim ring and center disk in the major welding operation. Each of these tack-welded parts is 0.010 in. thick, and this bulk enables them to act as buffers against burns or abrasions as the sandwich assembly revolves under the wheel.

Completed diaphragms are nitrogen-tested. The rejection rate for leakage is only 1 pct. The company considers this to be a very low reject rate in view of the difficult nature of the welding job required.

The careful design that couldn't be translated into a successful product by any existing welding equipment was finally made into a reality. Thousands of these transmitters are now in daily use in industry.

In every field—

New Products and Processes Mark Metalworking Trends

- Recent Metal Show in Philadelphia displayed new ideas in every aisle . . . For example, low cost portable equipment points to a growing use of radioactive isotopes for x-ray inspection . . . Vacuum apparatus is geared to average foundry use.
- A wide array of equipment now uses ultrasonics for metal testing, cleaning and joining . . . Better quality in precision castings and forgings indicate expanding markets for these items . . . Here's a rundown of Metal Show highlights.

◆ PHILADELPHIA was the host city to thousands of metallurgists and metalworking production executives attending the 37th National Metal Congress and National Metal Exposition recently. The Congress, with seminars, forums and technical paper presentations sponsored by cooperating technical societies, spelled out the latest theoretical and practical advances in metallurgical science.

But, as usual, the colorful "Metal Show" at Convention Hall was the big attraction for most visitors. The 435 exhibitors required almost six acres of space to show their products, processes and ideas covering metalworking's many phases. Many booths displayed brand new wares, purposely kept under wraps until the show opened. Others had improved versions of more or less familiar items or ideas.

SCALE model of a vertical, drop-bottom heat treating furnace was a popular attraction.

The Metal Show always points up a few significant trends in answer to the question, "What's new?" Among these are (1) an increasing variety of radiography equipment using radioactive isotopes for energy sources; (2) more applications of vacuum techniques for furnace melting, degassing, and blast cleaning; (3) a greater variety of metal coatings and finishes for decorative or protective purposes.

Use of isotopes grows

Certainly deserving equal mention are the strides made during the past year toward (1) better quality and variety in precision forgings and castings; (2) greater use of ultrasonic techniques for nondestructive testing, metal cleaning and metal joining; (3) more all-around flexibility combined with better accuracy in testing and control instruments of all types; (4) faster, more foolproof methods for welding, heat treating and finishing metals.

At least two firms brought atomic energy to the attention of showgoers with equipment designed to use radioactive isotopes for nondestruc-

WITH 435 exhibits like these, the Show was a regular general store for the metal industry.

MACHINE made sparks fly as it automatically welded about 80 studs per minute to strip.

tive testing and inspection. Both showed several portable models of projectors that utilize a radioactive energy source to make beamed, internal and panoramic exposures. Some models in one projection lineup can contain up to four different radioactive sources, or up to four different strengths of the same source.

Of the projectors made by another firm, the smallest model sells for $2,400, uses a 5 curie source of iridium, and will radiograph steel to a maximum thickness of 1½ or 2 in. The price includes a set of accessories and a complete course of training for operators.

Manufacturers of these projectors feel optimistic about sales prospects, believe the price ranges on the equipment will be within reach of many metalworking firms. Over the long term they foresee specifications for radiographic inspection tied-in with many more production jobs than presently carry such test requirements.

As an example of how vacuum techniques are being applied to metalworking on a broader scale, 12 Metal Show exhibitors displayed vacuum furnaces and accessory equipment. Latest wrinkle in vacuum units is one that can be used in the average foundry to degas molten metal in the ladle or crucible.

Such equipment was displayed by two companies. Advantages of vacuum degassing for the modern foundry are said to include (1) greatly reduced porosity, (2) cleaner castings, (3) elimination of chemical and gas flushing, (4) utilization of lower grade secondary metals, (5) elimination of costly impregnation processes, (6) no special skill required.

In still another metalworking area, many show visitors were impressed by the broad range of metal coatings available for either decorative or protective purposes, or both. Plated, laquered, anodized and roll-bonded vinyl coatings were to be seen everywhere. And products of the latest dip and spray coating techniques were evident to an equal degree.

The most significant thing about these metal finishes is that many of them, applied to sheet or strip materials, will withstand severe forming operations without cracking, chipping or peeling. Obviously, the cost of prefinishing before fabrication is, in most cases, much less than the ex-

SELF-contained, self-powered mobile x-ray machines move right to the job for inspection.

pense involved in finishing parts after they are formed.

Colorful and tough vinyl coatings, rolled and adhesive-bonded to sheet aluminum or steel under heat and pressure, are making a strong bid for attention from architects and designers of consumer products. To demonstrate how these panels could be used for a variety of purposes, one manufacturer of stud welding machinery was studwelding small samples on the uncoated side. This was done without scorching the vinyl coating or distorting the work in any way.

Welding is accomplished by the discharge from a capacitor bank. The process is more commonly known as stored energy welding. With the stud in place in the welding gun, and the work positioned for contact, actual welding time is only about one millisecond. So instantaneous is the cycle that the current density of approximately 300,000 amp per sq in. has no effect on the plated, painted, enameled or vinyl coated face of the workpiece.

No flux is required for this welding operation. However, the end of the stud must have a small tip, the diameter of which varies from 1/64 to 1/32 in. depending on the materials being welded and their thicknesses.

In the field of metal forming, even the most casual show visitor could not be unaware of the continuing development in precision casting techniques. Once limited to permanent mold, plaster mold and die casting methods, the foundry industry is booming its production of investment and shell cast precision products.

The latest thing in investment casting, in addition to the well known lost wax and frozen mercury pattern methods, is the use of polystyrene plastic patterns. They're precision-molded in steel dies and are used to form close-tolerance investment mold cavities. The patterns are one-shot items, being made to vaporize and disappear from the mold cavity as the actual casting metal flows into place.

Another casting innovation is the use of a rigid but ductile core material to permit the casting of small diameter, intricate and unlined holes in aluminum and magnesium alloys. The core is said to eliminate the need for stainless steel tubular inserts to achieve pressure tightness; also the need to use costly machining methods for hole production.

The core is made of a permeable, non-gas-forming refractory. The process requires inexpensive but accurate tooling. Holes cast by this method can be long or short, straight or curved —even to S-bends and hairpin shapes. Narrow passageways can be designed with rounded corners to promote better fluid flow.

Precision forming by the powder metallurgy process also gained a step toward greater flexibility with the introduction of new compacting presses. One 50-ton unit demonstrated two upper and three lower motions for compacting complex, multi-level parts. New presses such as those exhibited should help to counter the often heard complaint that powder metallurgy progress suffers because fabricators are forced to use crude adaptations of power press equipment.

As evidence of another major trend in the metal industries, the word "ultrasonic" could either be seen or heard in virtually every aisle of the huge Convention Hall. A surprising number of firms were demonstrating the principle of flaw detection by nondestructive ultrasonic means. And there are more makes and models of ultrasonic cleaners for metal parts than were available a year or so ago.

Ultrasonics applied to soldering

Units based on the ultrasonic principle are also offered in several model sizes and capacities to permit fluxless soldering of aluminum, copper, brass, silver, magnesium and silicon. No corrosive flux is required to remove the metallic oxide coating prior to tinning or solder coating. Ultrasonic energy cleans off this oxide layer, thus allowing the solder to flow smoothly over the metal surface.

The Metal Show, as always, offered a variety of products and process ideas for those interested in heat treating. The combination of efficient, automatic work handling devices, and automatic controls for temperature and atmosphere, is responsible for much of the recent progress in this field.

One of the newest control devices is a self-contained pneumatic unit that automatically maintains the dewpoint and thus the carbon potential of a heat treating furnace. It operates on 20 psi air supply; a non-bleed type pilot valve is said to reduce air consumption to a minimum.

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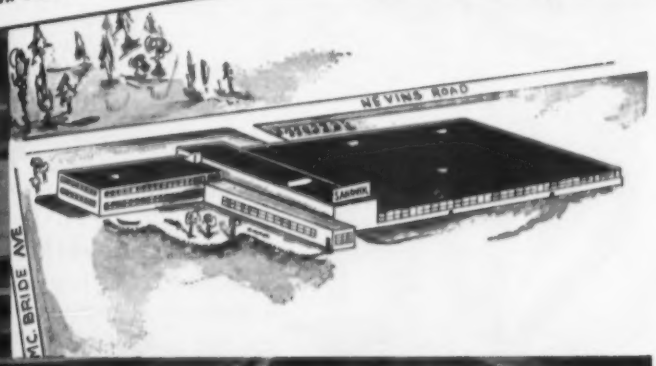

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New Technical Literature:

Catalogs and Bulletins

Battery Maintenance

A new 48-page manual on lead acid batteries for all types of motive power application has just been issued. The manual covers industrial truck, marine service, mine locomotives, railroad Diesel starting, and carlighting and air-conditioning service. Photographs, charts, tables, methods of repair, maintenance and salient points on theory of operation, etc., are included. *C & D Batteries, Inc.*

For free copy circle No. 1 on postcard, p. 117.

Metalworking presses

Metalworking presses for extrusion, metal forming and drawing, forging, bending, flanging, crimping and straightening and pipe-fabricating are covered in Bulletin 3201. In 12 pages, the booklet describes the broad range of applications possible, shows typical installations, and includes tables of capacities for press rams. Engineering services offered are listed. *Baldwin-Lima-Hamilton Corp.*

For free copy circle No. 2 on postcard, p. 117.

EM-20 steels

A 24-page data sheet gives detailed information and many graphs on Monimax and Sinimax EM-20 steels for the electrical industry. *Allegheny Ludlum Steel Corp.*

For free copy circle No. 3 on postcard, p. 117.

Magnetic Drums

Permanent magnetic drum applications and features are described in a new illustrated 6-page bulletin MD-200. Advantages of the drums for automatically removing tramp iron or ferrous material from gravity or conveyor transported products in the processing of coal, cement, slag, ore, chemicals, sand, etc., are given. Bulletin includes diagrams, performance data, application guides and pictures and descriptions of the drums. *The Homer Mfg. Co.*

For free copy circle No. 4 on postcard, p. 117.

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 117.

Fork lift trucks

A compact, maneuverable 5000-lb. fork lift truck, the HC-50, is described in a bulletin now available. Specifications, a mechanical description and the various models of other lift trucks produced by the company are shown. Specifications listed include 79-in. turning radius, 7110-lb weight. *Hyster Company*

For free copy circle No. 5 on postcard, p. 117.

Micro-drills

Sphinx micro-drills for instrument work, automatic screw machines, and watchmakers are described in a 4-page bulletin, which includes listings of left hand and center drills now available. Drilling attachments and the Micro-drill press are also shown. *Louis Levin & Son, Inc.*

For free copy circle No. 6 on postcard, p. 117.

Surface grinders

Designed specifically for machining flat surfaces on long run jobs in continuous, single-pass operation, new high production rotary automatic surface grinders are covered in a new bulletin. Various models available are shown, together with information on how the use of automatic or manual fixtures, handling devices and automatic sizing make the machines more versatile. A number of case histories are included. *Mattison Machine Works.*

For free copy circle No. 7 on postcard, p. 117.

FREE TECHNICAL LITERATURE

Grinding coolant

A 2-page bulletin on Triple C grinding coolant for wet grinding suggests advantages and recommended uses for the coolant, now available in liquid as well as crystalline form. *The Motch & Merryweather Machinery Co.*

For free copy circle No. 8 on postcard, p. 117.

Dial index feed

Literature on an automatic dial index feed for use on Benchmaster and other type punch presses and on drill presses is offered. The accessory converts a standard machine to almost full automation, avoiding need for special one-purpose tools, and operates up to 6000 strokes per hour. *Benchmaster Mfg. Co.*

For free copy circle No. 9 on postcard, p. 117.

Analog-to-digital converter

An 8-page illustrated brochure describes the new analog-to-digital converter, with capacity up to 100,000 conversions per second, 30 mv resolution and one-tenth pct guaranteed accuracy. The brochure shows systems in which the converter operates. *J. B. Rea Co., Inc.*

For free copy circle No. 10 on postcard, p. 117.

Honing Services

The low-velocity abrading technique of Microhoning is described in a 32-page service and equipment catalog. Advantages of the process, features of the equipment, and scope of services offered are covered. *Micromatic Hone Corp.*

For free copy circle No. 11 on postcard, p. 117.

Hydraulic tables

A new edition of Bulletin 50, "Handbook of Hydraulic Tables and Other Engineering Data," is offered. The 28-page booklet is intended as a reference for hydraulic engineers interested in pumping, piping problems. *Aldrich Pump Co.*

For free copy circle No. 12 on postcard, p. 117.

Gap frame presses

The company's modernized line of gap frame double crank presses are presented in Bulletin 65C. The literature shows both the Upright Series B and Open Back Inclinable Series BI. *Niagara Machine & Tool Works.*

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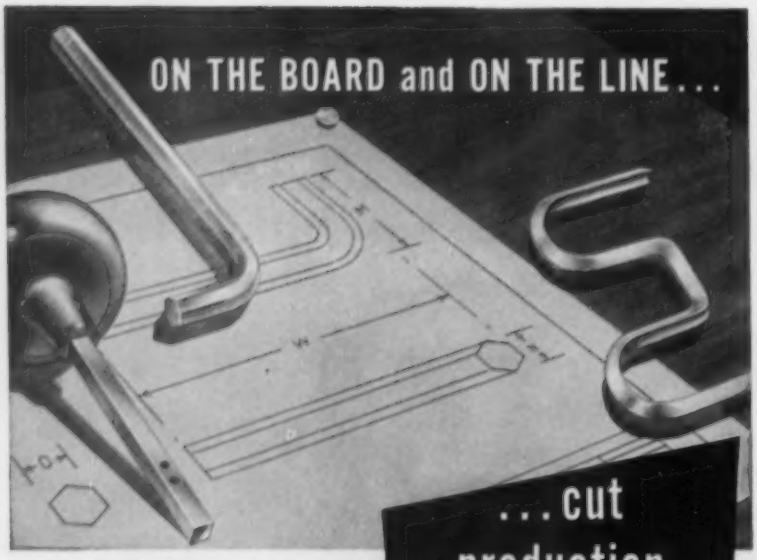

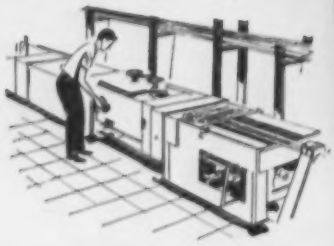

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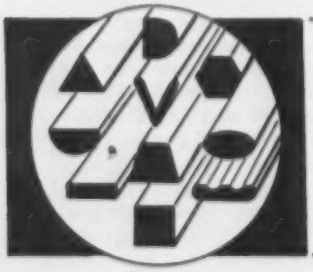

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FREE TECHNICAL LITERATURE

Gamma ray projector

A portable gamma ray projector for industrial radiography is described in a 24-page booklet. The publication discusses general aspects of radioactivity, offers an explanation of the three gamma ray sources used with the device, and details operation and construction features of three models now offered. *M. W. Kellogg Co.*

For free copy circle No. 14 on postcard, p. 117.

Machine tools

"Thirty Years of Special Machine Tools with Automation," a 24-page catalog, describes past, present and future automation concepts for special machine tools from both engineering and application points of view. A two-page glossary is devoted to automation words and phrases. Twenty new machine tools are shown. *Snyder Tool & Engineering Co.*

For free copy circle No. 15 on postcard, p. 117.

Tractor story

The engineering, design and production stories of the HD-11G tractor are pictorially presented in a new 8-page bulletin. Included are specifications of the unit and a description of the various features which contribute to easier servicing, less down-time in the field, and increased operator comfort. *Allis-Chalmers Mfg. Co.*

For free copy circle No. 16 on postcard, p. 117.

Throwaway inserts

A new booklet featuring 17 throwaway insert styles of Kendex tooling is offered. The booklet, Form B-300, shows how the tooling eliminates all grinding, cuts cost per cutting edge, indexes in seconds and provides a new chip control system. Square and triangular shapes providing up to 8 cutting edges per insert are covered. *Kennametal Inc.*

For free copy circle No. 17 on postcard, p. 117.

Boron handbook

"Boron Carbide and Elemental Boron" is the title of a 16-page technical handbook on materials made by the company for use in the atomic energy field. Discussed are Boron for Neutron Absorption, Technical Grade Boron, Properties of Boron and similar topics. *Norton Company.*

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This section starts on p. 112

Pneumatic comparators

Features and advantages of Air-O-Limit comparators are discussed in a new 24-page bulletin. Included are a description of the pneumatic gaging method, a listing of the component parts of the gages and photos and specifications on the various gages offered. *Pratt & Whitney Div., Niles-Bement-Pond Co.*

For free copy circle No. 19 on postcard.

Horizontal punching units

Technical data on Type H horizontal hole punching units is offered in a new catalog. Units are described as suitable for punching holes in flanges, angles, container sides and similar shaped and formed work, with punches moving horizontally rather than up and down. *Wales-Strippit Corp.*

For free copy circle No. 20 on postcard.

Centerless grinders

Centreless grinders are the subject of a 26-page catalog, which illustrates and gives specifications and extra equipment available for two sizes available. Some applications are shown and a variety of automation ideas are offered. *Landis Tool Co.*

For free copy circle No. 21 on postcard.

Sealing compound

A 1-page bulletin lists some applications of Babbitrite in cleaning and painting, pouring insulation, splash shielding, machinery installations, welding and brazing, casting low melting alloys and lead, etc. The material is described as a sealing, damming, positioning and molding compound. *Babbitrite Products Co.*

For free copy circle No. 33 on postcard.

Impressed current anodes

"Duriron Impressed Current Anodes for Cathodic Protection" discusses this high-silicon cast iron from a corrosion resistance standpoint, gives composition and properties, and application data. *The Duriron Company, Inc.*

For free copy circle No. 23 on postcard.

Dial gages, setmasters

Comprehensive data on dial gages and setmasters used in measuring inside and outside dimensions on machine parts are found in a new catalog. Besides giving specific details on the company's line of snap, bore, large diam and length gages, etc., the catalog includes ruled sketch sheets, to simplify the presenting of gaging problems. *Boice Manufacturing Co., Inc.*

For free copy circle No. 24 on postcard.

Stainless wire and strip

Bulletin T-1 discusses in detail the mechanical properties and spring characteristics of the precipitation hardening stainless steel, Type 17-7 PH, available in wire, rod and strip form. Information on available forms and sizes and on heat-treating procedures is included in the 4-page bulletin. *Alloy Metal Wire Div., H. K. Porter Co., Inc.*

For free copy circle No. 25 on postcard.

Filters

Sel-Rex double-duty filters for use in electroplating, chemical processing, pharmaceuticals, food and beverages, paints and varnishes, etc., are the subjects of a new 4-page booklet. The new filtration principle which provides double filtration area and volume is shown. Design and construction features of the equipment are included. *Bart-Messing Corp.*

For free copy circle No. 26 on postcard.

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. 11/3/55

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FIRST CLASS PERMIT No. 36 (Sec. 349 P.L.&R.) New York, N. Y.

BUSINESS REPLY CARD
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POSTAGE WILL BE PAID BY

THE IRON AGE
Post Office Box 77
Village Station
NEW YORK 14, N. Y.

Fiberglas panels

A 4-page folder showing Alsynite flat panes and corrugated translucent fiberglas panels for varied industrial use has just been published. It contains full information on the scientifically engineered fiberglas flat panes for glazing, with suggested construction details for metal-covered building and double-pitched skylights. Illustrations show typical industrial uses. *Alsynite Co. of America.*

For free copy circle No. 27 on postcard.

Refractories

An 8-page illustrated bulletin describes the Tamul, Tasil and Tamax brands of super-refractories. The literature discusses properties and applications of these sillimanite or bonded mullite special high-temperature refractories. *The Chas. Taylor Sons Co.*

For free copy circle No. 28 on postcard.

Grinding wheels

"How to Select Grinding Wheels for Precision Grinding, Tool and Construction Steels" is the title of a 22-page booklet now available. This publication consists of reprints of three articles that appeared in Grits and Grinds, the company's monthly magazine on better grinding. Articles were written by a Company grinding engineer, and the booklet is liberally illustrated with photos, charts and other worthwhile technical data. *Norton Company.*

For free copy circle No. 29 on postcard.

Laboratory equipment

A new catalog supplement describes, in just over 100 pages, all of the instruments, apparatus, glassware, laboratory furniture and accessories added to the Company's stocks since publication of the last major catalog in 1952. The new supplement is illustrated with photos and woodcuts and includes dozens of new instruments, especially in the electrochemical, petroleum and clinical fields, developed and manufactured by the company. For simplification, more than 7000 reagents supplied have been left out for separate listing. *Fisher Scientific Co.*

For free copy circle No. 30 on postcard.

Contour projectors

Six models of Kodak Contour Projectors are described in a new catalog, including the Model 14-5 shown for the first time recently at the Production Engineering Show in Chicago. Detailed descriptions of each model are given, together with specifications and listings of accessories. The booklet also discusses the use of optical gaging in the toolroom, in production, in receiving and in final inspection. *Eastman Kodak Co., Special Products Sales Div.*

For free copy circle No. 31 on postcard.

Electro-pneumatic control

Complete information about new Series 60 Current Adjusting Type Control Unit and associated converter for electro-pneumatic process control is given in 8-page folder ND4 (8). The publication tells how the system combines pneumatic valve operation with the flexibility and fast response of an electrical control system. Photos and line drawings show the complete control system, including Speedomax G or H indicator recorder, C.A.T. control unit and the electro-pneumatic converter. *Leeds & Northrup Co.*

For free copy circle No. 32 on postcard.

Power positioners

The complete line of Hagan pneumatic power positioners for exacting control jobs in every industry is described in a packet of specification sheets. The 6 sheets cover performance and construction specifications for all standard models and describe how the positioners are applied for controlling flow, pressure, temperature, or level by operating valves, gates, or dampers. *Hagan Corporation.*

For free copy circle No. 33 on postcard.

Clay guns

Clay guns for blast furnaces and large electric furnaces is the subject of a new 4-page bulletin just published. The 600 psi clay pressure guns are described and illustrated for use in plugging tapping holes, and unique mounting features which assure accurate tapping-hole positioning are shown. *William M. Bailey Co.*

For free copy circle No. 34 on postcard.

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THE IRON AGE

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NEW YORK 14, N. Y.

FIRST CLASS PERMIT No. 36 (Sec. 34.9 P.L.&R.) New York, N. Y.

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **11/3/55**

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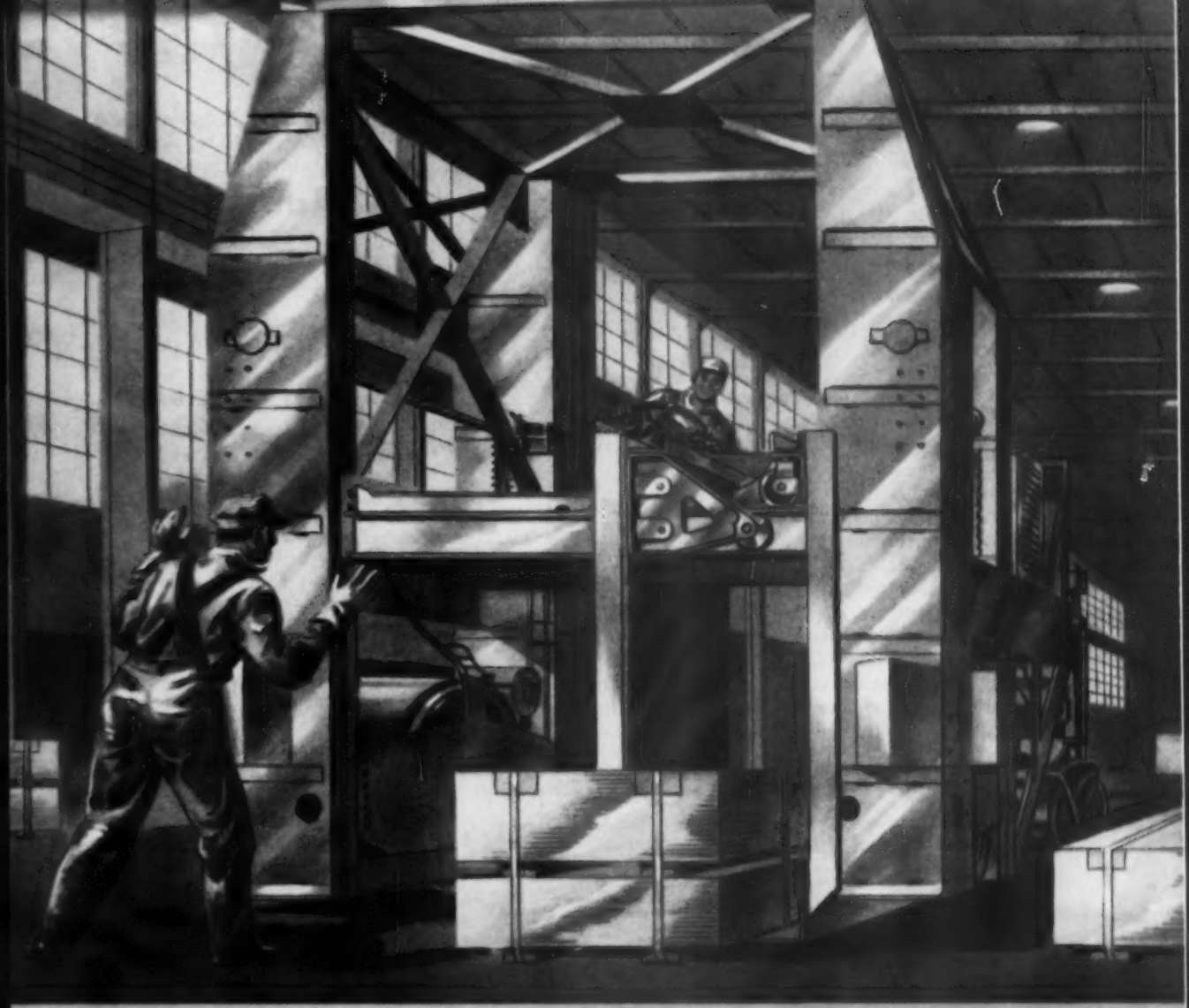


Alliance Sheet Carriers...

KEEP YOUR SHEETS ON THE MOVE

Alliance
SHEET CARRIER

● The big **Alliance Sheet Carrier** moves sheets when and where you want them—travels from building to building; handles loads as heavy as those moved by light cranes and does crane duty in buildings where light construction makes cranes impractical. It's stable, easy to operate and highly maneuverable. We build to the capacity you specify with diesel-electric or gasoline-electric power. Specifications include hydraulic lift, clamp and steering. Write for details. Let us show you how the **Alliance Sheet Carrier** can eliminate delays and keep floors clear in your plant.

THE ALLIANCE MACHINE COMPANY

FOUNDED 1901

MAIN OFFICE • ALLIANCE, OHIO

Give Us The Runway
And We'll Lift The World

Manufacturers of:
LADLE CRANES • GANTRY CRANES • FORGING MANIPULATORS • SOAKING PIT CRANES • STRIPPER CRANES • SLAB AND BILLET CHARGING MACHINES • OPEN HEARTH CHARGING MACHINES • SPECIAL MILL MACHINERY • STRUCTURAL FABRICATION • COKE PUSHERS • ORE BRIDGES • SHEET CARRIERS

TECHNICAL BRIEFS

Birmingham Co., Inc., manufactur-

INSPECTION: Industrial TV Checks Blade Edge

Television permits faster and more accurate scraper blade inspection . . . Image, magnified 288 times, shows on screen as a solid 4-in. bar . . . Tolerance limits also appear on screen.

American Can Co.'s machine shop in Cincinnati, making the first use of closed-circuit television in the can industry for inspecting knife blades for sharpness, is getting the job done twice as fast and with more accuracy than was formerly possible.

The company uses the TV as part of a newly-developed system for inspecting chrome - plated scraper blades used in lithography coating machines. These are magnified to 288 times their actual size. Previously, inspectors checked for imperfections which might impair their efficiency by looking at them through ordinary microscopes.

Rapid Tolerance Check

A small industrial TV camera does the job. It picks up the image and transfers what it sees to the receiving set, just a few feet away, as the inspector moves the blade edge slowly through a holder under the microscope. As each part of the blade passes under the microscope, it is reproduced on the receiving set screen as a horizontal bar about 4-in. wide.

Also appearing on the screen are two thin vertical lines, very close together. These indicate tolerance limits. Any blade with an irregularity exceeding the space between the lines must be discarded.

Inspects blade sharpness . .

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 117. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

ALLEN HEAD
ALLEN KEYS
New bright finish
New kit
Lower prices**
Now the hex keys furnished in Allen key sets have a high luster coating — better looking — rust resistant — makes size markings easier to read.
Available in six sets, all packaged in new red-trimmed plastic envelopes.
No. 603 11 short arm keys 3/32" through 5/8"
*No. 604 7 short arm keys 5/64" through 1/4"
*No. 605 6 short arm keys .050" through 5/32"
No. 606 11 short arm keys .050" through 3/8"
No. 614 11 long arm keys 3/32" through 5/8"
*No. 616 9 extra long arm keys 5/64" through 3/8"
*Bright Coated Keys **On Nos. 604 and 605
Order from your Allen Industrial Distributor or write us for bulletin C38 for your files.
ALLEN Manufacturing Company, Hartford 2, Connecticut, U.S.A.

Handling:

Special baskets load parts for nitriding.

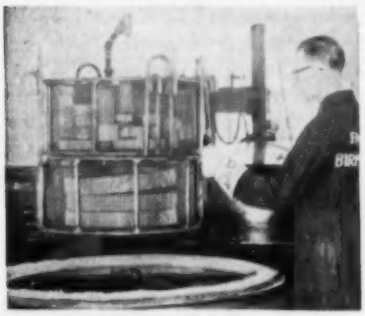
Special Inconel baskets for loading smaller than customary machinery parts into the main basket of a nitriding furnace are being employed for cycles ranging from 45 hours to 180 hours at temperature.

Built by Wiretex Mfg. Co., Bridgeport, Conn., for the Farrel-

Birmingham Co., Inc., manufacturers of heavy machinery, the baskets may be used individually or two together, depending on the work load to be lowered into the main basket. Unusually long, slim machinery parts can be hung from the bottom mesh of the baskets.

For Heavy Loads

Baskets are designed to carry heavy loads. In general, the machined parts are made of either



Inconel baskets . . .

4140, 4340 or one of the Nitralloy steels.

The nitriding process at Farrel-Birmingham uses ammonia gas at varying degrees of dissociation and temperatures up to 975 to 1000° F. Baskets are constructed with 2-mesh, 120-in. Inconel wire. They are 27-in. in diam by 12-in. deep, with frame and braces of ⅝-in. diam rod, lifting hooks and handle of ¾-in. diam rod.

Broaching:

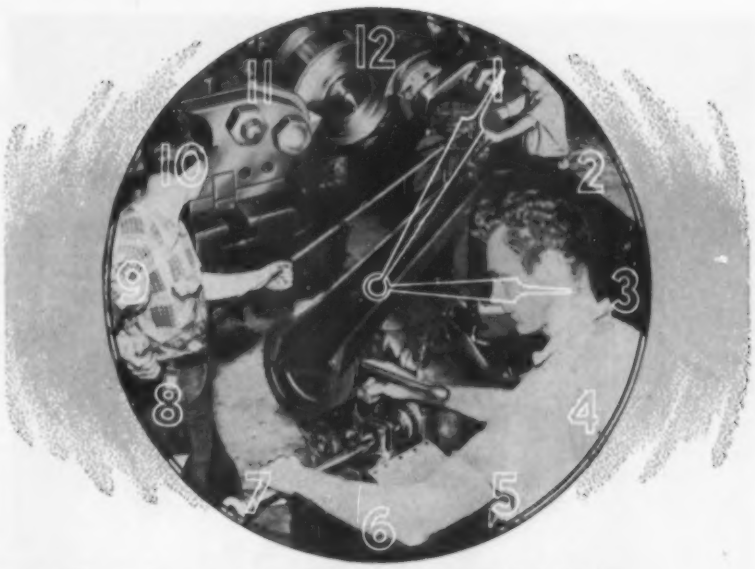
Gears readied for shaving in one pass

A huge new broach produces a 73-tooth automatic transmission internal helical gear nearly 6-in. in diam and 1-in. wide in a single pass, ready for shaving.

Designed and delivered by National Broach & Machine Co., Detroit, the new broach, among the largest ever made for internal helical running gears, is nearly 7-ft long and weighs about 700 lb.

Close-Tolerance Cutting

The unusual high speed steel broach is made to "tenths of a thousandth" accuracy and enables



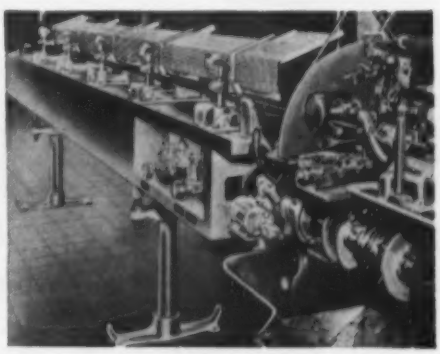
Why let the 4th DIMENSION limit your machine tool output?

A trip to the washroom or tool crib, a halt for feed finger repair, a spinning empty chuck—these interruptions to the steady flow of production can never be made up . . . for TIME, the 4th Dimension, waits for neither man nor machine.

Over 150 firms have learned how to use every minute of every shift for continuous, 4th Dimension production. Here's how . . .

Lipe A.M.L. Bar Feed Eliminates Time Losses, Increases Output 30% or More

The Lipe Automatic Magazine-Loading Bar Feed is an air-operated attachment which holds an 8-hour supply of bar, rod or tubing and feeds it continuously to any machine equipped with a fixed stop. There are no feed fingers to break down—nothing to scratch or mar polished stock. It will feed any length in one feed-out, thereby cutting cycle time. Remnants are ejected automatically. Idle operation ("cutting air") is eliminated.



Send for this free book. Shows how to convert your machine tools to 4th Dimension Production.

LIPE-ROLLWAY CORPORATION
Syracuse 4, N.Y.

Send me free book on how to gear machine tools to the steady flow of Time.

Name ..... Title .....

Company .....

Street .....

City ..... Zone ..... State .....

Press operator Hannah Jones, who has worked presses of different makes for several years, prefers this 100-ton Warco to anything she has operated. Here she shows Personnel Director Myron Timms one of the reasons why—the increased production of tractor muffler heads.

"Since We've Tried WARCO Presses We've Bought Nothing Else" - - Says Leading Automotive Muffler Manufacturer

Company That Operates 130 Presses Has Purchased Only Warco Equipment Since 1951

The MacKenzie Muffler Co., Inc., is recognized as one of the nation's leading designers and builders of mufflers for the automotive industry. In the manufacture of their product the blanking and forming press plays an important part. In fact, this concern has more than 100 presses in daily use. In 1951 they decided to try their first Warco Press. They watched it closely, recording production and maintenance figures. "It sold itself to us," say company officials, "so well that we have purchased nothing but Warcos since."

Warco quality is like that. Once you compare you'll discover that Warco Presses outperform them all. It will pay to let your Warco representative know the next time you're in the market for press equipment.

Federal® WELDERS

Warco PRESSES®

THE FEDERAL MACHINE AND WELDER CO.
WARREN, OHIO

Removes only a few ten thousandths of stock . . ."

the shaving cutter to finish the teeth on the SAE 5140 steel tubing gear blank to extremely close tolerances, by removing only a few ten-thousandths of stock. The broach teeth were ground from the solid on a grinding machine equipped with specially designed headstock, lead bar arrangement, automatic index mechanism and wheel trimmers.

Two design innovations, and ones most difficult to include on a precision tool of this type, are tooth protuberance and tooth chamfering features. Teeth on the broach have a special protuberance form that provides clearance in the bottom of the gear tooth spaces for the shaving cutter. The inside diameter gear tooth edges are chamfered by the broach as it produces the teeth.

Concentricity Assured

The inside diameter of the internal gear is also finished by integral rings near the end of the broach as it passes through the gear blank, thus providing absolute concentricity of O.D., I.D. and sides of the gear teeth.

Special tooth configurations are provided on the roughing tooth sections of the broach to hold the close lead tolerance desired in the finished broached gear blank.

The internal gear produced by the broach in one pass has 73, 14-

700-lb broach . . .

YOU BUY ONE MACHINE . . .
GET THE PERFORMANCE OF TWO

BROWNHOIST *diesel-electric locomotive-cranes double as switch engines*

The exceptional performance of Industrial Brownhoist Diesel-Electric Locomotive-Cranes handling bulk materials with magnet, hook or bucket is well known to railroads, mines, steel mills and other large manufacturing plants. Not so well known, perhaps is the fact that these powerful, efficient machines perform equally well as switch engines. Employing electric powered locomotion with the same type of travel generator, motor and axle reduction unit as modern switching locomotives, Brownhoist Cranes provide rapid acceleration, high drawbar pull and speeds of twelve miles per hour for switching operations. They will haul up to 7 or 8 heavily loaded cars on straight, level track. During switching operations, the rotating superstructure that actuates the crane mechanism can be mechanically disengaged to eliminate wear on the shafts and other driven parts in the upperworks. Brownhoist Cranes are available in capacities from 25 to 90 tons and up for your switching and heavy duty materials handling operations — two dependable pieces of equipment in one husky unit for greater versatility and economical operation. For complete information, consult your nearest Brownhoist representative or write us today.

INDUSTRIAL BROWNHOIST CORPORATION

BAY CITY, MICHIGAN • DISTRICT OFFICES: New York, Philadelphia, Cleveland, Chicago, Denver, San Francisco, Montreal • AGENCIES: Detroit, Birmingham, Houston, Los Angeles

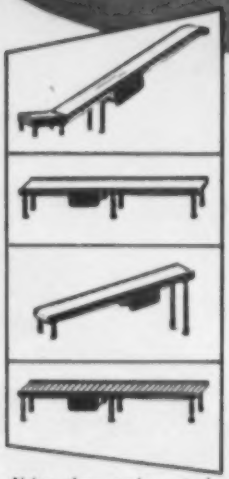
BROWNHOIST MATERIAL HANDLING EQUIPMENT GIVES A LIFT TO AMERICAN INDUSTRY

BROWNHOIST

BUILDS BETTER HEAVY DUTY MATERIALS HANDLING EQUIPMENT

Often you can
DO IT YOURSELF
at a Saving!

Testing of air conditioners is simplified by Roller Conveyor line in rear. Units then travel via Adapto Belt Conveyor in foreground to packing and shipping.



Using these various stock-size Adapto Units, plus stock-size Roller and Wheel Conveyor Sections, a worth-while conveyor installation frequently can be effected at savings in both cost and time.

Make your own conveyor layout and installation! In many instances this is possible and at a saving to you, with Logan standardized conveyors known as Adapto Units. These units can be bought virtually "off the shelf," are shipped promptly and are surprisingly low in price. Write for Adapto Booklet, covering pre-engineered stock-size parts for Belt and Live Roll Conveyors. A comprehensive handling system often can be effected right in the field, with your own maintenance crew. Write for booklet today.

LOGAN CO., 545 CABEL ST.
LOUISVILLE 6, KY.

Logan Conveyor
ADAPTO UNITS

Write for Adapto Unit Booklet. No obligation.

pitch, 20-deg pressure angle teeth. The helix angle of the gear is about 20 degrees. All critical dimensions on the broach are held to within 0.0002-in. tolerance through the application of precision techniques in machining, grinding and heat treatment.

Maintenance:

Gases inhibit jet engine corrosion.

Corrosion can stop a Navy turbo-jet engine as surely as enemy bullets, and can form overnight between flights. Working for the Navy Bureau of Aeronautics, a Cambridge, Mass., consulting research firm, has developed a new process that reduces this danger substantially, and which is believed to be applicable to other industrial packaging and storage applications where corrosion is a problem.

The process employs corrosion-inhibiting gases that are sealed into a plane's jet engine upon return from a flight. An Arthur D. Little, Inc., research team devised testing methods to reproduce the corrosion-forming conditions to which the planes are subject. They then tested most of the currently used inhibitors. From this research came the new process.

Seal Engine Ends

The ADL team found that by sealing the ends of the jet engines with air-tight plugs containing the gaseous components of the inhibitor, they could create a compound inside the engine and so protect all the hard-to-reach parts. Starting the planes will quickly clear out the compound.

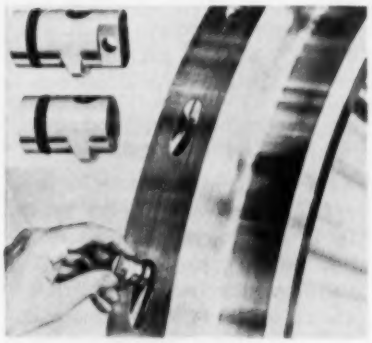
In other applications, the firm suggests that the defense industry's layaway program for production tools might use gas-filled hutments, or that use of impregnated wrappings on larger packages than are now possible with currently used materials is practical with the new process.

Materials:

Sintered carbide doubles nozzle life.

A San Francisco company reports it is successfully fighting the abrasive action of the materials handled by its centrifuge equipment, with sintered cemented carbides. Use of carbides, the company points out, has virtually doubled nozzle life of the equipments.

Merco Centrifugal Co. makes the centrifuges for the chemical and petroleum industries. The tiny nozzles are made in various



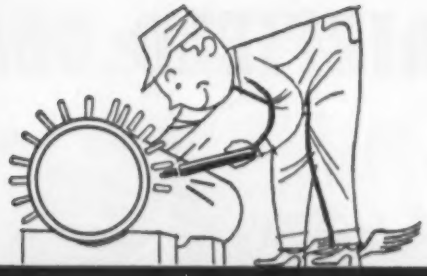
Pressures to 1200 psi . . .

sizes, ranging in diameter from 0.035 in. to 0.156 in. with outside diameters ranging from ⅛ to ¾ in. These are used in numbers, depending on the equipment size, to handle liquids and particles at separating forces 9000 times that of gravity. In most operations, a pressure of about 1200 psi is exerted on the back side of the nozzles to expel materials during the centrifugal action of a separator.

Quickly Worn

In the past, maintaining top efficiency in the machines meant nozzles had to be replaced frequently, due to severe abrasive action of materials in such operations as bentonite refining, potato and corn starch separation, sulphuric acid processing, and removing finely dispersed solid impurities from valuable solutions.

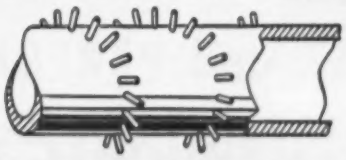
As machine effectiveness decreased due to nozzle wear, elec-



"STUD" NELSON
ATTACHES TEETH
IN A FLASH!

Threshers, harvesters, cornpickers and a wide variety of ginning and combing machinery get their teeth in short order with the NELWELD® System, the trigger-quick way to end-weld studs and other projections to steel. You reduce manufacturing costs, increase production and improve product quality. And with the NELWELD® System, the studs are there to stay!

END-WELDED NELSON STUDS ON COTTON GIN ROLL



If your product requires teeth, "dogs," or welded projections of any sort, call in a Nelson Field Engineer. He will be glad to study your product design and advise how the NELWELD® System can be used to your advantage. Mail the attached coupon for complete information.

Stud Nelson

Fasten it Better at Less Cost with

NELWELD

NELSON STUD WELDING
2732 Toledo Avenue
Lorain, Ohio

Please send more information on how to cut costs, improve product design by the NELWELD method.

NAME _____

COMPANY _____

ADDRESS _____

CITY AND STATE _____

NELSON STUD WELDING DIV. OF GREGORY INDUSTRIES, INC. LORAIN, OHIO

Use FAIRFIELD GEARS

the POWER and PERFORMANCE OF YOUR PRODUCT

There's hardly a power driven machine built that doesn't depend on gears for its get-up-and-go—its productivity—and very often *its reputation.*

No wonder, then, why more and more manufacturers insist on Fairfield Gears for their QUALITY—and also for their mass-production ECONOMY.

No matter what type or size of gears you require, it will pay you to check with Fairfield first. Take advantage, too, of Fairfield's helpful engineering services. *Your inquiry will receive prompt attention.*

Ask for interesting, illustrated bulletin.

Fine Gears Made to Order

SPUR GEARS—Straight, helical, and internal. Sizes from 16 pitch, 1½" dia., to 1½ pitch, 36" dia.
HERRINGBONE—(Fellows Type). Sizes from 1½" to 15".
SPIRAL BEVEL—Sizes from 16 pitch, 1½" dia., to 1½ pitch, 28" dia.
STRAIGHT BEVEL—Sizes from 16 pitch, 1½" dia., to 1½ pitch, 28" dia.
HYPOID—Sizes from 1½" to 28" dia.
ZEROL—Sizes from 16 pitch, 1½" dia., to 1½ pitch, 21" dia.
WORMS AND WORM GEARS—Worms to 7" dia. Worm gears to 36" dia.
SPLINED SHAFTS—Lengths to 52". Diameters from 1" to 6".
DIFFERENTIALS—10,000 to 300,000 inch pounds capacity.

Note: All sizes above are approximate.

FAIRFIELD MANUFACTURING CO. — For FINE GEARS

2319 SOUTH CONCORD ROAD · LAFAYETTE, INDIANA

trical power consumption increased since more power was required to keep the materials in the centrifuge moving at the proper rate of speed.

Tried Rubber Linings

In its efforts to overcome the problem the company tried lining the nozzles with rubber. But the centrifugal action of the equipment which tended to flow or distort the rubber, quickly knocked rubber out of the picture. This led to an attempt to adapt cast tungsten carbide.

Although the application of this metal showed some improvement, the company felt it was not good enough, and made another attempt with Carboloy grade 999 sintered tungsten carbide. This time the application was successful.

8-to-12 Month Service

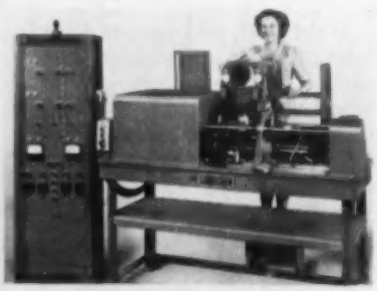
As a result, present nozzles are providing services ranging from 8 to 12 months, without necessitating nozzle changes. These include operations running continuously 13 out of 14 days. On most applications the company reports nozzles are averaging about twice the wear life of the previous carbide tried.

On the equipment, the company uses 20 carbide nozzles in the rotors of its largest centrifuges, and four on its smallest.

Quality Control:

Sorting gage checks six part conditions.

A leading automotive equipment manufacturer is using a fully automatic sorting gage as



Automatic sorter . . .

an integral part of its production line to measure six conditions of automobile push-rods, at a rate of 2500 per hour.

Built by Federal Products Corp., Providence, R. I., the Electricator gaging units and reluctance hardness testers check the push-rods, which are conveyor-fed to the units, for OD and hardness at both ends, and for overall length and straightness. Parts are sorted into three categories: Good, Salvage, and Scrap. Good parts are fed to a conveyor to continue on to the next process, while scrap and salvage parts are sorted into separate bins.

Percentage Counters Used

To give the manufacturer maximum control over the various processes, percentage counters have been provided at each gaging station. When the number of rejects at any station exceeds the allowable limit, signal lights flash and the gage operates relays to shut down the process machine feeding the inferior parts to the particular gage.

The system controls the amount of scrap and so contributes to smoother and more economical production of the parts.

Packaging:

Foundry materials get polyethylene wrapping.

Packaging their line of foundry mudding and joint sealer compounds, permanent mold coatings and paste type core and mold coatings in polyethyle has produced several benefits for Frederic B. Stevens, Inc.

The packaging idea employs a polyethylene liner bag or envelope that clings to the interior wall of the shipping container. Benefits include:

1. Preservation of paste products indefinitely against drying out and deterioration during long storage.

2. Delivery of products clean and free from rust, dust and other contamination.

For the vital links in your

call in STANDARD conveyor

Up-to-the-minute conveyor planning between automatic machines and control points is essential to gain the full benefits of automation. Your needs in conveyors — ranging from engineered systems of power and gravity types to single units — can be met by Standard. Nearly 50 years of "package" conveyor application experience is available to you. Our engineers can choose from roller, belt, slat, chain, wheel, push-bar conveyors, spiral chutes and pneumatic tube systems, plus special portable types.

If you have plans of *any kind* — adding to present facilities or completely modernizing with a new conveyor system — write and tell us what you make or convey. Or call your Standard representative listed in your classified phone book. Send for General Catalog — address Dept. IA-11-55.

STANDARD CONVEYOR COMPANY
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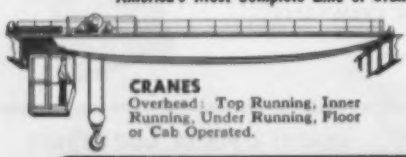
America's Most Complete Line of Cranes and Hoists since 1903



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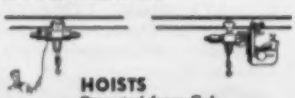

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3. Protection against hardening of contents of partly used containers when the line is folded over the material.

Polyethylene packaged . . .

4. No rusting through of containers.

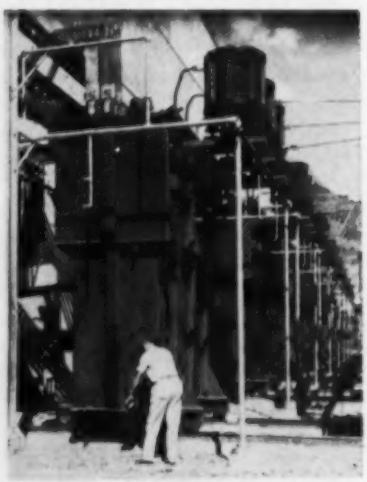
5. All elimination of waste, since contents can be used by lifting the liner out of the container.

6. Utilization of pieces of polyethylene from emptied liners for keeping products such as mudding compound moist in the work areas.

Power:

Potline transformers are water-cooled.

The first water-cooled rectifier transformers ever used on an aluminum pot line are serving the Anaconda Aluminum Co.'s two



More compact . . .

new pot lines at Columbia Falls, Montana.

Using the water-cooled units instead of the previous self-cooled ones, several operating advantages are gained. Among these, transformer floor area is reduced to less than half, weight is decreased by 35 pct, and first cost is less. Sixteen rectifier transformers are used in the installation, eight for each of two 100,000-amp, 700-v pot lines.

Each 10,200-kva transformer takes power at 13.8 kv and feeds it into a 12,500-amp ignitron rectifier unit at 700 v. The eight rectifiers in parallel supply the 100,000-ampere pot line.

Fabrication:

Chrome-moly pipe bakes five different heats.

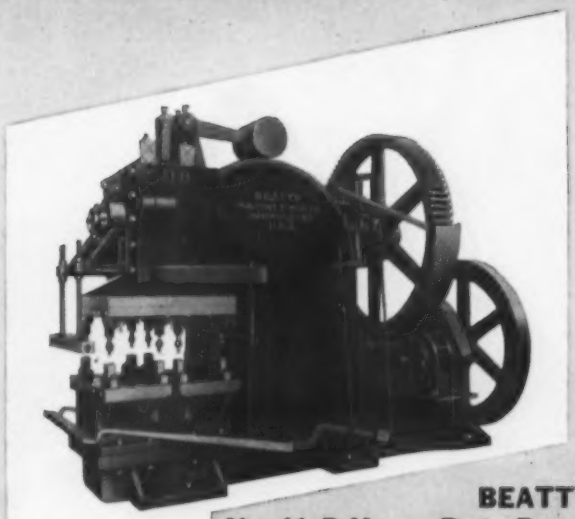
Five different heats were required to give a 30-ft section of fusion welded chrome-moly pipe a 90 deg bend and an offset of 24 deg 18 min on an 11-ft radius.

For 1050°F service . . .

As pipes like this arrive from the mill and after the assembly has been completed, the Power Div. of Blaw-Knox, Pittsburgh, photographs them. To compensate for natural thinning of outside wells during bends, this pipe was ordered fabricated 10 pct thicker than specifications required, so that when bent, sufficient wall thickness would remain.

This pipe will be used at a generating station for 475-lb steam reheat at 1050°F.

FOR FASTER
HEAVY DUTY PUNCHING



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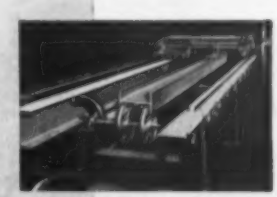
BEATTY Guillotine Beam Flange Punch for flange punching of beams. Built-in adjustable tools save set-up time. 200 ton cap.



BEATTY Spacing Table handles web and flange punching without roll adjustment.

In less time, with less manpower, this BEATTY Heavy Duty Punch handles even the most complicated punching jobs . . . produces up to 34 patterns without a single tool change.

Used with the standard BEATTY Spacing Table, it accommodates steel shapes up to 65 ft. long and plates up to 42 in. wide. With exceptionally large die space, the machine can be tooled to the specific needs of the job—punches webs and flanges. Spacing of holes and slots is precise and practically automatic with the BEATTY Spacing Table.

In addition to increasing your output, this versatile unit reduces your labor costs. One operator and one helper are all the manpower required, and the machine is built for either right or left hand operation.

Consult a Beatty engineer for more information on a *job-engineered* BEATTY installation to fit your needs.

BEATTY Gap Type Press for forming, bending, flanging, pressing. 250 ton cap.

BEATTY Horizontal Hydraulic Bulldozer for heavy forming, flanging and bending.

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OUR ERIE STRAYER BUCKETS WORK LONG HOURS, NEED LITTLE SERVICE

Reports Max Dozoretz, Partner, Lancaster Iron and Metal Co.

Clamshell buckets are put to many tough jobs. Probably the toughest is handling scrap metal. The constant brush of steel against steel lays up the ordinary bucket for frequent repairs and soon wears it out.

But not an Erie Strayer bucket! Mr. Dozoretz knows Erie Buckets. He has two of them on the job constantly. He says, "We work our Erie buckets hard—eight to ten hours a day, six days a week. We know they'll deliver full payloads with every pass.

"And we lose no time for maintenance! Our first Erie bucket has been in service, continuously, for six years now and is still going strong."

Compare the Erie with any other clamshell. You'll quickly note its finer engineering and the rugged construction that has made it the bucket preferred by experienced operators everywhere.

These Erie Features Mean More Days of More Work

1. Top closing power from block and tackle, plus lever arm construction, plus precision balancing.
2. Manganese steel teeth and high carbon steel lips that bite up full payloads of even toughest clay and gumbo.
3. Rigid, one-piece, welded head that shrugs off bumps and jars. No shimmy. No wobble.
4. Two-line, continuous reeving. Adds up to 50% to cable life. Less down-time for reeving.
5. Low head room for fast work in tight quarters; low center of gravity for easy positioning.

For catalogs, write Dept. A115, Cable Address: EXIMPORT

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Heat Treating:

Pit-type carburizer incorporates several innovations.

What is believed to be among the largest radiant tube pit-type gas carburizing furnace ever built is among new heat-treating equipment recently installed in the Pittsburgh, Pa., plant of Pittsburgh Gear Co.

Designed to provide the most advanced techniques in deep case carburizing and hardening in controlled atmosphere, the new

Carburizes 6-ft gears . . .

equipment will increase production and widen the range of gears available, including new sizes running up to over 6 ft. in diam.

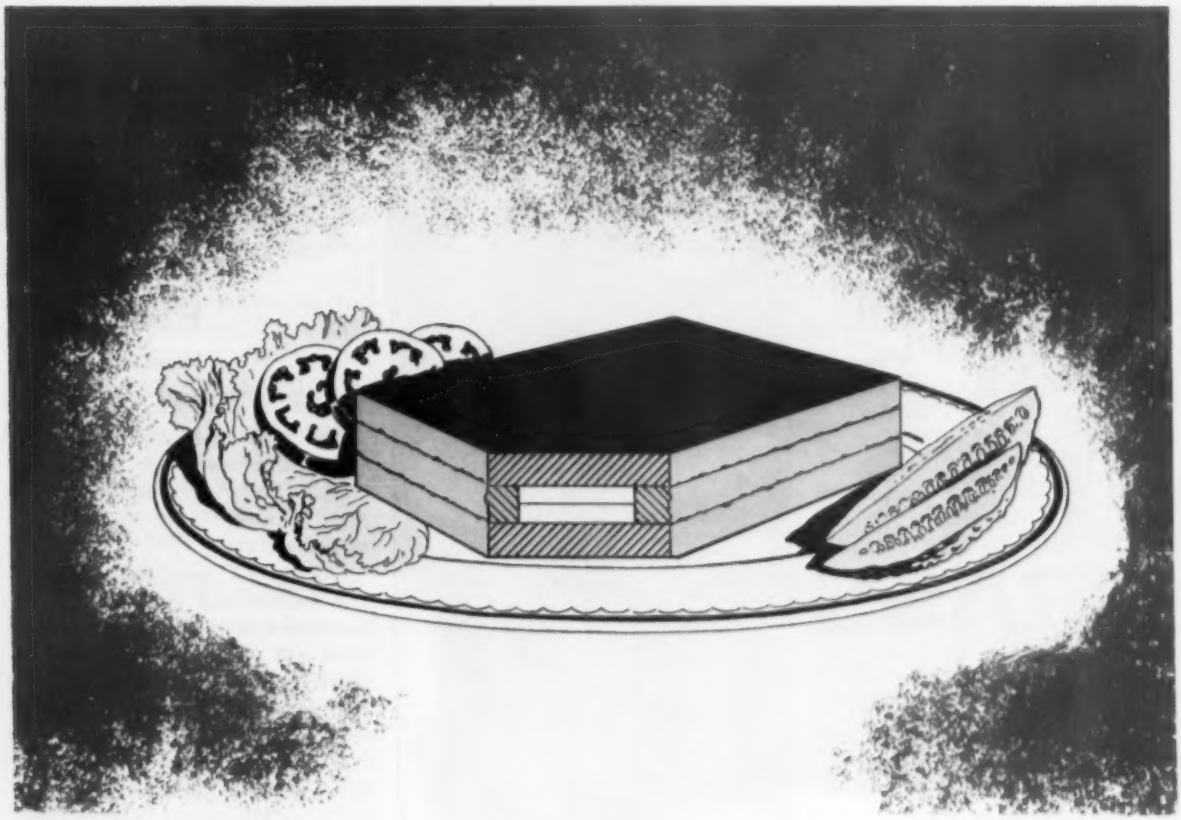
Other New Items

In addition to the carburizing and hardening furnace, the equipment includes a double propeller agitated 6000-gal direct cooled quench tank, an 8000-gal reserve storage provided with heat exchangers and coolers to maintain and control oil quench temperatures, and a Radivection dual-heat 1400°F draw furnace.

This system handles parts up to 6-ft in diam to 6-ft long, and up to 8500-lb in weight. It was designed to produce up to 25 tons of deep case carburizing per month.

Dew Point Control

Accurate control of carbon penetration and carbon potential is provided through the use of an endothermic generator to which is added metered quantities of natural gas for furnace dew point control.



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As you know, a "sandwich" is merely the unit, consisting of two stainless plates between two carbon or alloy steel plates, which is assembled and rolled into stainless-clad plates.

When you buy *this* sandwich, you get all the benefits of solid stainless steel—for less cost.

Claymont Stainless-Clad Steel Plates give you all the corrosion and contamination resistance of stainless steel where protection is needed, and the economy of carbon steel where strength is required. You can specify the cladding in any percentage your process requires—from 5% to 50% of the total plate thickness.

So if you fabricate or use equipment where product contamination or corrosion is a problem—if you are looking for stainless steel protection at lower cost—you can use Claymont Stainless-Clad Steel Plates to good advantage. For full details, contact the nearest sales office shown below, or write direct to Wickwire Spencer Steel Division, The Colorado Fuel and Iron Corporation, P.O. Box 1951, Wilmington, Delaware.

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Early production tests are reported to have shown excellent results in the carburizing of various shapes and sizes of gears, shafts, pinions, etc., particularly where gears requiring various case depths are loaded together.

Plastics:

Minesweeper has polyethylene water tanks.

The U. S. S.S. Cormorant, an all wood minesweeper containing plastic tanks and some plastic pipe, is now seeing active duty with the Navy.

The 144-ft wood-hulled craft was constructed in an effort to counteract the attraction of metal ships for magnetic mines. The American Agile Corp. of Cleveland constructed two fresh water tanks, each having a capacity of 1028 gal, of its polyethylene Agilene. Each tank weighs 675-lb and is of all-welded construction. Similar tanks aboard other Navy ships, made of monel metal, weigh 5737-lb.

One-fourth the Weight

Tanks are 10 ft long and 48 in. wide at the widest part of the top tapering to 36 in. at the narrowest part. They are also 48 in. deep. The plastic tanks and piping and their fittings weigh about one-quarter of what standard steel units would weigh, and any necessary repairs will be much simpler to make.

The company says the semi-self supporting tanks were made completely self-supporting by extruding polyethylene over aluminus tubing, according to the design submitted by Agile and accepted by the Navy.

Machining:

Air-operated chuck supports 750-lb load.

While swedging operations form the nose, the entire weight of a 750-lb bomb casing is supported by a 10-in. air-operated manufac-

turing type self-centering chuck. Jaw pressure is actuated solely by air power through a 10-in. aluminum body rotating air cylinder.

In the operation at Walsh Construction Co., Portland, Me., the front half of the bomb casing is heated red hot, and is rolled onto the cradle arm which raises the casing in line with the chuck. The work head is moved forward so that the casing rim is seated in the tapered pilot located on the work head, which assures proper positioning. Air pressure is applied and the chuck special top jaws grip the casing on the inside diameter of the rim.

Formed at 3 to 4 rpm

After the cradle arm is lowered leaving the entire 750-lb load held only by the chuck, the geared work head is moved forward, so that the casing nose enters the swedging machine cavity for forming at 3 to 4 rpm. During the swedging operation, the bomb casing is supported by only the chuck and two rest buttons.

When swedging is completed, the bomb casing is withdrawn and sprayed with water from an ordinary garden hose. The cradle arm is raised to support the casing prior to release, after which it lowers the casing to a conveyor for the next machining operation.

Rolling:

Couplings help end hot mill problem.

More than 10,000 hours of trouble-free performance by two gear type spindle roll drive couplings at the 80-in. hot strip mill of United States Steel Corp.'s Irvin Works are showing the way to the solution of a traditional mill maintenance problem.

The gear type couplings, produced by American Flexible Coupling Co., Erie, Pa., serve pinch roll drives of the hot mill's coiler machinery. Utilizing specially patented gear teeth with fully crowned flanks at either end of

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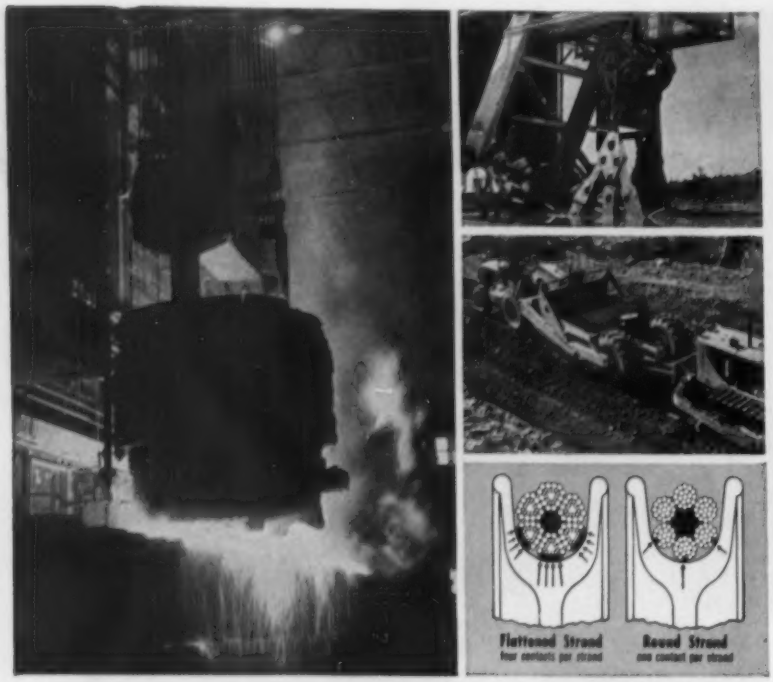

How to handle the tough jobs with Hercules Flattened Strand wire rope

When you think you need a super-rope, check Hercules Flattened Strand. This is the wire rope that packs in 10% more steel than round strand rope, making it 10% stronger and safer. It wears longer and more evenly—reduces sheave wear, too.

The 10% extra strength over round strand rope is sometimes the difference between the possible and the impossible. Hercules Flattened Strand frequently does the tough jobs which would otherwise require larger size rope—and without the bother and expense of changing sheaves and drums. The extra strength is useful, too, when shock loading is involved. Saves rope—and money.

If you think that Hercules Flattened Strand wire rope may solve a problem, talk it over first with your Leschen man. He can be reached through your nearby Leschen distributor. His advice is based on the best possible authority—Leschen's long experience and engineering research—the longest in the industry. And with Leschen wire rope you are assured of higher-than-rated quality and longer-than-expected service.

If you can use Hercules Flattened Strand rope you'll be money ahead. See about it soon.

Depend on Leschen's higher-than-rated quality for longer-than-expected service.

LESCHEN
HERCULES Red-Strand® WIRE ROPE
LESCHEN WIRE ROPE DIVISION
H. K. PORTER COMPANY, INC.
St. Louis 12, Missouri
HKP

"Eliminate the need for costly maintenance identified with slipper-type couplings . . ."

the spindle shaft, the gear type couplings eliminate the need for brass slippers and costly machine maintenance identified with universal or slipper-type couplings.

2700-ton production

The mill, one of the largest of its kind in the country, has an average production of better than 2700 tons per eight-hour turn. Steel slabs, ranging from 5 in. to 7¾ in. in thickness and 18 ft long, are passed in a continuous operation through four roughers and six finishing stands. Finished steel, from 0.048 to 0.250 in. thick and from 20 to 73 in. wide, is handled by any one of three coilers at a rate up to 2000 rpm.

The spindle drive couplings serve the lower rolls of two of the coilers. Each of the couplings—with a 7⅛-in. shaft diameter, a 10 3/16-in. hub diameter and a 13⅝-in. flange—operates at three degrees misalignment.

No maintenance

The first coupling was installed in April 1954; the second one a year later. During their period of operation in the coilers, the couplings have needed no maintenance attention other than periodic greasing. Four conventional universal couplings installed in the same coiler assembly, have required customary routine maintenance at the end of an 18-turn week.

The weekly maintenance of each universal coupling involves the replacement of four brass slippers —two at either end of the spindle shaft. Expenses associated with the operation include: cost of material plus an average time expenditure of three hours for machining each slipper.

483 replacements

During 1953, when universal couplings were used exclusively

in the pinch roll drive machinery, 483 brass slippers were replaced according to records maintained at the Irvin Works.

Nor does the weekly maintenance expense of replacing slippers reflect the total savings achieved through the use of the gear type couplings. Additional costs incidental to the use of universal or slipper-type spindle drive couplings include the rewelding and machining of the spindle tongue every two weeks and similar machining of the slipper seat every three months.

Maintenance Comparison

Maintenance of the spindle tongues requires approximately eight hours per spindle, while the machining of slipper seats involves a time expenditure of double that amount.

The coupling can be adapted to special-purpose rolling operations in ferrous and non-ferrous blooming, strip, rod, sheet and structural rolling mills. The coupling is designed to establish a uniform wear pattern on the central portion of the gear teeth while carrying a full work load—a factor that contributes to higher shock loading and improved torque-carrying capacity, regardless of operating angles.

New Books:

"Machining Kaiser Aluminum." Publication discusses all phases of machining aluminum, including various types of machine tools and their usage and cutting tools; machining characteristics of the various alloys, together with data on speeds, feeds, depths of cut, etc.; and discussion of when general practice indicates standard design tools are best and when special designs or particular practice is best. Kaiser Aluminum & Chemical Sales, Inc., 228 North LaSalle St., Chicago 1. Free if requested on company letterhead; $2.00 for personal libraries. 320 p.

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• alloyed 25% Cr—12% Ni
• for 1750°F. temperatures

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These stools should offer a very pertinent tie-in with your casting requirements. Essentially, they are alloyed to resist heat. They're typical of the heavy high alloy castings we are equipped to turn out.

They will serve also to indicate what we can do in the way of producing castings to resist not only high temperatures but severe corrosion or combinations of heat and corrosion, as well.

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Many in both the metal working and processing fields have come to look upon Duraloy as the leading producer of exclusively high alloy castings. This reputation has been built on many years production of sound castings properly alloyed. We'll be glad to discuss your high alloy casting requirements.

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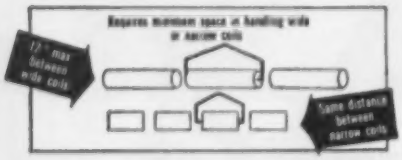
• C-F Coil Lifters are saving time and labor in many plants and warehouses because they can pick up, carry and set down a coil of steel faster and safer than any other method. Infinite jaw openings permit handling a very wide range of coil widths . . . carrying legs open fast, stay open until operator closes them on coil. Narrow legs require minimum space between piles – a space saving advantage. Made in motorized models for crane cab or pendant operation as well as manual types with chain wheel, in capacities from 3 tons up. Powered Rotating Heads available. Opening ranges to suit your requirements. Write for illustrated Bulletin.



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revised code covers power, industrial gas and air, refinery and oil transportation, district heating, refrigeration, fabrication details, materials and appendix. American Society of Mechanical Engineers, Order Dept., 29 West 39th St., New York 18. $3.50. 138 p.

"Better Foremanship — Key to Profitable Management," by Rexford Hersey. New, larger edition of *Better Foremanship* presents to foremen and higher management a complete package for testing, training and guiding foremen. Aims to give the foreman the working tools of his profession, a basic conception of how to handle them, and a practical concept of his day-to-day job. Chilton Co., Book Div., Chestnut and 56th Sts., Philadelphia, Pa. $6.00. 342 p.

"Principles of Metal Casting," by R. W. Heine and P. C. Rosenthal. A comprehensive, up-to-date treatment of metal casting. Covers molding processes, mold materials and construction, etc. Many tables, graphs, line diagrams, photos, etc., illustrate the book. McGraw-Hill Book Co., 330 West 42nd St., New York 36, $7.50. 640 p.

"A Fair Day's Work for a Fair Day's Pay." Discusses such topics as whether the employe can be loyal to both company and union, the real meaning of a fair day's work for a fair day's pay, from both management and union's point of view, and the motivation and control of office employes. American Management Association, 330 West 42nd St., New York 36. $1 AMA members, $1.75 others. 44 p.

"Handbook of Engineering Materials," edited by D. F. Miner and J. B. Seastone, represents the combined resources of 51 specialists from numerous fields. Emphasis in the book is on selection and use of material, with major attention directed to their adaptability to fabricating methods, availability, costs and limitations. John Wiley & Sons, Inc. $17.50. 1382 p.

"How to Lead Men," Management Report No. 219. A steno-

TECHNICAL BRIEFS

graphic brief of a panel discussion given recently before the California Personnel Management Association by a 5-man panel composed of business and labor people. The California Personnel Management Association, 2180 Milvia St., Berkeley 4, Calif. $1.00. Ten pages.

"The Inspection and Testing of Metals." A compilation of lectures delivered at the Institution of Metallurgists. Chapters include inspection of metals in service, in the steel industry, inspection of nonferrous metals, assessments of methods of destructive and nondestructive testing and batch testing and sampling of metals. The Institution of Metallurgists, 28 Victoria St., London, S.W. 1.

"Card Service," The Library of Congress, through its Card Div., maintains a special service designed to meet the needs of those desiring bibliographic information on a particular topic, such as Aeronautics, plastics, etc. It is also possible to receive currently all new cards in your field of interest, insofar as the titles have been cataloged. Cards received on a standing order basis keep the individual informed of current material being published which he might wish to receive. The Library of Congress, Washington 25, D. C.

"Catalogs of Government technical reports." Two new catalogs are now available, one covering electroplating and polishing and the other photochemistry and photoelectricity. Catalogs list applicable research reports in the Office of Technical Service collection of more than 250,000 documents. Office of Technical Services, U. S. Dept. of Commerce., Washington 25, D. C. $0.10.

"Making Managers out of Foremen and Supervisors," by Arthur C. Croft. Paper delivered before the California Personnel Management Association recently by Mr. Croft, president of the National Foremen's Institute. California Personnel Management Associa- 2180 Milvia St., Berkeley 4. Report No. 214, $1. 8 p.

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Insert chasers are like safety razor blades: they cost so little that you can throw them away when dull. Or, for utmost economy, you can resharpen them over and over again. Only a flash grind is required. For less than $40 you get a dozen sets of ¾–16 insert chasers, each set ground ready to go. You will be amazed at the quantity of threads they will cut, even to Class 3 specifications, with a minimum of downtime. FREE: "Selecting the Proper Die Head for the Job".

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PRESIDENT, THE CINCINNATI GEAR CO.

We don't like to admit it, but we make our share of mistakes. Fortunately, these do not occur too often but when they do, we see to it that they do not reach you, our customer. Before any gear leaves our factory, it goes through a tough final inspection. Each of our highly trained inspectors checks the work as if he were the inspector in the customer's plant. These men answer only to me, thereby eliminating any possibility of influence that might be exerted by those interested only in production.

Recently when we were manufacturing a large order of bronze worm gears, a very serious error was inadvertently made during the manufacturing process. In spite of constant vigilance, this was not discovered until the gears reached final inspection. The boys sure found it at that time. Actually the error amounted to the fact that the teeth had been cut about .010 too deep. While it might have been possible to make the mating worms oversize, this thought was the farthest from our minds. Because the worm gears were NOT correct, they were scrapped and replaced. The loss resulted in one of the largest single scrapped orders that we ever had. It hurt.

We believe that our ardent will to supply gears of only the highest quality pays off. Our customers have the assurance that when they receive gears from CINCINNATI GEAR, these have been through a rigid and thorough inspection and are ready for assembly. Our men understand that there is "no compromise with quality," and that is the policy under which they operate. We also believe this is the least costly for our customers because once they receive our gears, they know there will be no "hidden" costs during assembly.

THE CINCINNATI GEAR CO.

CINCINNATI 27, OHIO

"Gears — Good Gears Only"

CINTI

FINISHING: Aluminum Protector

A clear, weather-resistant aluminum coating has sharply reduced truck body maintenance costs . . . Other applications seen

A protective coating for aluminum-fabricated equipment recently emerged from a 16-month, 128,000 mile test on a Mason & Dixon Lines truck, and is reported to have kept the aluminum body in excellent condition on those portions where it was tested. Other truck panels, left uncoated as a "control," showed typical corrosive pitting and dulling.

Called Clear Coating CH64, the transparent, weather resistant lacquer was developed when Egyptian Lacquer Mfg. Co., of South Kearney, N. J., and Lafayette, Ind., approached Eastman Chemical Products, Inc., New York, N. Y., with a proposal that the two firms pool their efforts to develop an easily applicable long-life lacquer for outdoor aluminum surfaces. Eastman agreed, and after considerable preliminary work the formulation selected as most promising on the basis of controlled panel tests was ready for trial on performance tests.

Truckers Interested

The trailer-truck industry seemed a likely subject, so the Mason & Dixon Lines firm was approached, and agreed to cooperate. Anything which would cut down on truck maintenance or terminal time was of interest to them. One of their trucks was selected as a guinea pig and isolated panels were sprayed with the new lacquer, while other panels were left uncoated. The coated sections were those known to be most subject to discoloration and pitting.

The first truck, treated 16 months ago, is still in perfect condition at the points where the butyrate coating was applied. Where the aluminum was left bare, however, the usual surface pitting shows quite plainly. Further tests were made, and have completely borne out the early findings.

The coating was easily and quickly applied following a solvent wash to insure maximum adhesion. No prime coating was needed, and the coating applied by usual spray methods, dried at room temperature in 10 to 15 minutes, ready for use.

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 117. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

128,000-mile test . . .

You can cut costs...improve design...simplify purchasing with C-D-F DIAMOND® VULCANIZED FIBRE

If your job is to select a general-purpose insulating material that is low cost, useful for both electrical and mechanical applications, easy to machine and form, consider the advantages of a unique old-timer — C-D-F's Diamond Vulcanized Fibre. C-D-F first made fibre in 1895, back in the early days of the electrical industry, and is today one of the world's largest producers and developers of this versatile material.

OUTSTANDING MECHANICAL QUALITIES

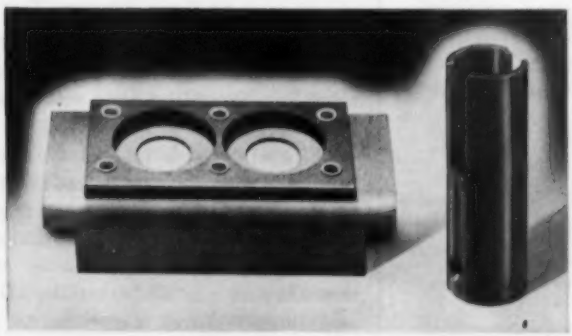
Think what Diamond Fibre can do. Its weight is half that of aluminum, yet it is one of the strongest materials known per unit weight. Tensile strength is 10,000 to 15,000 pounds per square inch. Shearing strength is about 10,000 pounds. Almost as strong as iron, on a weight:strength ratio basis. Diamond Fibre is tough and will not readily crack or shatter under heavy impacts. Its surface is hard and smooth. In forming, fibre can be moistened and dried repeatedly without having its structure, or quality significantly altered. C-D-F makes a special *forming* fibre, using *longer* cotton cellulosic fibers for added strength.

ALSO GOOD ELECTRICALLY

Although given a modest insulation rating for resistance to heat (A.I.E.E. Class A with a temperature limit of 221°F.), Diamond Fibre is often used because of its excellent arc resistance and good dielectric strength. It also has desirable deionizing properties and low heat conductivity. Fibre can be combined or surrounded with moisture-resistant laminated plastic. C-D-F does this in volume for manufacturers of low voltage cartridge fuses and high tension expulsion fuses. Inside is a fibre tube with excellent arc extinguishing properties and high internal bursting strength. Outside is a weather- and moisture-proof shield of rolled phenolic Dilecto.

MANY GRADES AND FORMS

Diamond Fibre sheet and roll grades include Bone, Commercial, and Electrical Insulation (fish paper) NEMA grades. Fibre tubing is normally made only in Bone grade, with rods available in both Bone and Commercial grades. The chart shown outlines the major characteristics of these grades. Special grades include fibre specifically adapted for these mechanical purposes: abrasive, bobbin, flexible, forming, pattern, shuttle, sanitary goods, trunk and case. Built-up sheets can be supplied that are lower in cost than standardard thick sheets.



GOOD EXAMPLES of Diamond Fibre formed and machined by C-D-F. *Left*—An insulating barrier made from three pieces of fibre, punched and formed. Fibre tubing is even used for rivets. *Right*—A fibre tube which has been smooth-sawed to length, punched twice and countersunk. C-D-F can handle the entire job for you, do it faster and at low cost. This includes selecting and testing the proper grade of fibre, machining and inspection, assembling if needed.

C-D-F BONE FIBRE	Hard, stiffest grade. High density. Resists wear, abrasion, has high compressive strength. Good dielectric strength when dry. Super machining qualities. Not recommended for bending.
C-D-F COMMERCIAL FIBRE	Mechanical and electrical grade. Medium density. Tough, pliable. Good mechanical properties. Fair dielectric strength, normally high when dry. Can be bent, punched, and formed.
C-D-F DIAMOND INSULATION	Electrical insulation "fish paper" grade. Unusually free from foreign matter. Withstands extreme bending and forming without cracking. High dielectric strength, except under high humidity.

WHAT IS FIBRE?

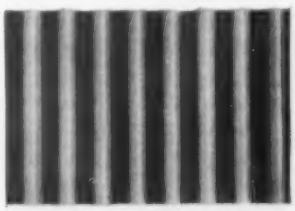
Vulcanized fibre is made by combining layers of chemically jelled paper. The chemical compound used in gelling the paper is subsequently removed by leaching and the resulting product, after being dried and finished by calendering, is a dense material of partially regenerated cellulose in which the fibrous structure is retained in varying degrees, depending upon the grade of fibre.
—NEMA Standard VU 1-1.1

VULCOID—A RESIN-IMPREGNATED FIBRE

One of C-D-F's products is a great material called Vulcoid. Vulcanized Fibre is its base, but a special combination of C-D-F resins give Vulcoid a moisture resistance intermediate between vulcanized fibre and that of higher-cost laminated thermosetting plastic. One company uses Vulcoid for electric light switch parts where it cuts their costs and improves their products. Another big outfit uses Vulcoid in place of fibre for its improved electrical properties and good formability. If you have never tested or heard of this C-D-F exclusive, write for details and samples.

MANY LESSONS IN FIBRE KNOW-HOW

At C-D-F there are bins holding thousands of sample Diamond Fibre parts — for electrical, textile, materials-handling, and machinery applications. They represent years of experience in designing and machining fibre to meet exacting needs. Also, they stand for C-D-F's ability to help you solve your specific materials selection problem. Get the facts about C-D-F and Diamond Fibre. Call your nearest C-D-F sales engineer (offices in principal cities), or look in Sweet's Product Design File. Write for samples and the new 1955 Diamond Fibre catalog with complete mechanical and electrical properties, size charts. Enclose your print for quotation—C-D-F is a big, reliable source of supply!



C-D-F CORRUGATED FIBRE is used by manufacturers of distribution transformers for load and oil ducts. The corrugations do not flatten out after baking or in oil at temperatures normal to such units. Also, it is more economical than laminated molded thermoplastic and can be cut to size, with a big saving in time and materials.

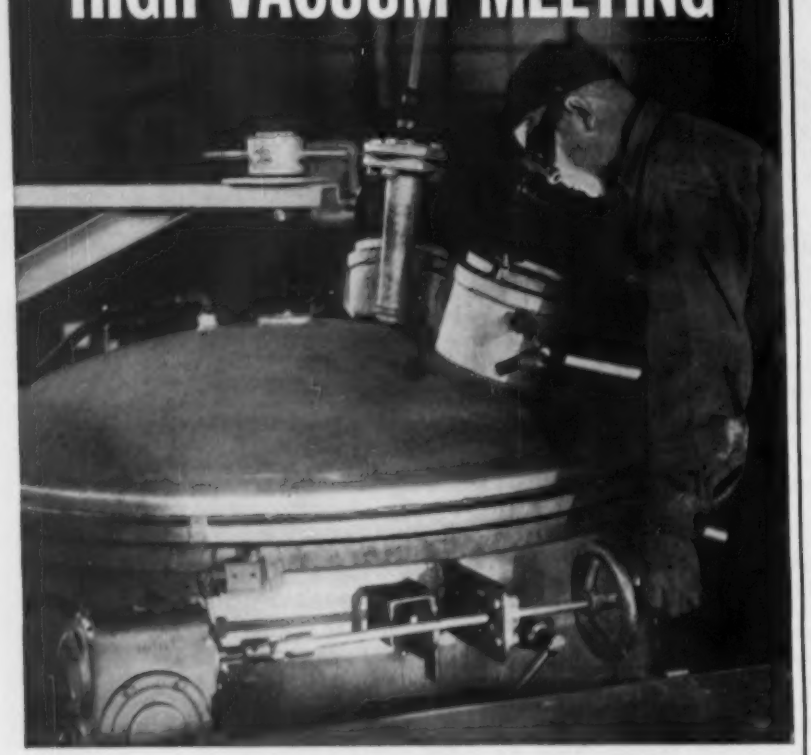
WRITE FOR NEW DIAMOND FIBRE CATALOG!

Continental-Diamond Fibre

CONTINENTAL-DIAMOND FIBRE DIVISION OF THE BUDD COMPANY, INC.
NEWARK 85, DELAWARE

What's the New "Magic" in Metals?

HIGH VACUUM MELTING



Technician viewing melt in NRC Vacuum Furnace from which come metals and alloys with new properties of strength, toughness, "cleanliness".

At Last . . . we've broken the barrier of Conventional Metal Properties!

Is your product made of metal? Is it facing increasingly tough performance demands from your customers? Have classical methods of melting, heat treating, annealing, alloying failed to yield the materials with which you can achieve the results demanded of you? What you want are the facts on *Vacuum Melting*. Out of NRC Vacuum Furnaces come metals and alloys with more closely controlled composition . . . purer . . . free of entrapped gases. They are stronger, tougher, "cleaner" than ever before. Make sure your product designers and metallurgists have the information in our Vacuum Furnace Bulletin. Write today.

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Fabrication:

Beryllium copper tubing meets waveguide specs.

Rectangular beryllium copper tubing meeting rigid grain growth and duplexing specifications is now being cold drawn by Superior Tube Co., Norristown, Pa., for use in fabricating flexible waveguides.

The thin-wall tubing (.007-inch wall) is furnished to Technicraft Laboratories, Thomaston, Conn., in the completely soft annealed condition, to prevent cracking of the wall during the severe convoluting operation which forms the flexible waveguide.

Tight Grain Size

Technicraft specifies that maximum ASTM grain size be held to .019/.022 mm. Duplexing, the formation of large and small grain areas next to each other, must be held to a minimum. This assures that waveguides will have maximum fatigue resistance and long life under repeated flexure.

It was found that excessive annealing during the cold drawing operation aggravates the grain growth and duplexing tendency inherent in the beryllium copper raw stock. By experimenting with various drawing and annealing schedules it arrived at one which holds grain size and duplexing to the required minimum, yet ends up with the tubing in a soft annealed condition for corrugation into flexible waveguides.

40-Hour Flexure Test

The tubing not only meets the grain size and temper specifications but also withstands a severe 40-hr flexure test.

Since close size tolerances are required for uniform microwave transmission characteristics, the 1.025-in. by 0.400-in. inner diam rectangular tubing is held to a tolerance of $\pm$0.003-in. on the ID and $\pm$0.0005-in. on the wall.

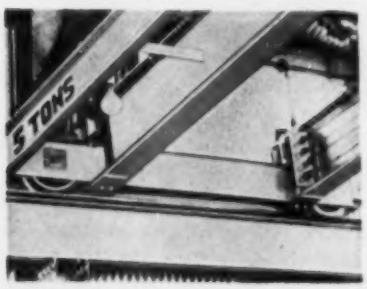
The waveguides fabricated from the tubing are used to transmit microwaves along desired paths in radar systems.

Casting:

Meehanite provides crane wheel advantages.

A leading southwestern manufacturer of overhead traveling cranes, crane runways, hoists and trolleys has standardized on specifying Meehanite metal for all the crane and hoist traveling wheels it manufactures, because of its strength and vibration-absorbing qualities.

In its search for ways to improve on the performance of its materials handling equipments, the company, Lypta, Inc., of Houston, Texas, found Meehanite cast



Quieter crane . . .

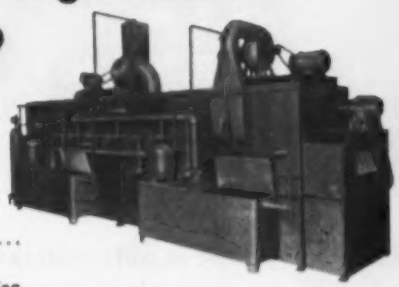
and machined wheels to be better than those wheels made either of cast iron or "car wheel iron" from the standpoint of strength. Because of its better vibration-absorbing qualities, Meehanite metal was also found to provide smoother, quieter operation of the crane equipment over their service life.

Better Impact Resistance

The company established during its investigations that the use of the material for traveling wheels on cranes and trolleys provided a considerable increase in impact resistance, with adequate strength properties.

Other advantages gained from using the metal for their crane and hoist traveling wheels, they found, are better machining qualities, less wear on rails because of their graphite content, and as an additional design advantage, good adaptability of the coatings to heat treatment and flame hardening.

Why Invest in an A-F Cleaning or Processing Machine NOW?



YOUR costs up . . . competition higher . . . profits beginning to slip?

Why invest capital funds now in cleaning and processing equipment? Why not wait for a change?

The answer is, "Nothing is so constant as change." You can wait too long, you know . . . obsolete equipment may allow your competition to make greater inroads.

OR—you can insure "quality control" and lower costs now—with modern A-F Cleaning and Finishing Machines so you compete in today's tougher conditions.

INVESTIGATE! Before you order any cleaning or processing machine—write us. If a "standard" A-F Machine will not do the job, A-F Engineers are specialists in custom-built equipment . . . since 1901.

Every A-F Machine is actually job engineered to lower your costs.

For newest brochure—showing how to select the right machine for the job you have in mind—write today.

A-F

A-F *ENGINEERED*
Cleaning and Finishing Machines
Plant-wide Conveying Systems
Pre-Engineered Conveyors—Roller, Wheel, Belt, Trolley

THE ALVEY-FERGUSON CO., 560 Disney Street, CINCINNATI 9, OHIO and Azusa, California

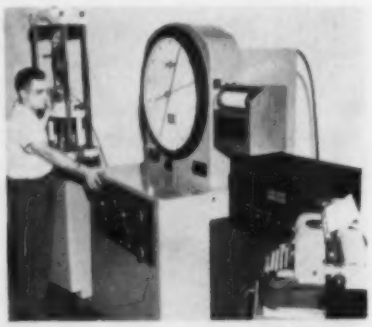
NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies . . . for more data use the free postcard on page 117 or 118

Universal tester is automatically controlled

Designated the Automatic Super "L" Universal Testing Machine, a new physical testing unit merely requires the operator to insert the specimen and start the equipment. A built-in programming unit then causes the amount and duration of load applications to be accurately repeated indefinitely, for successive tests with similar specimens, until changed by the operator. An automatic typewriter prints yield strength for the percentage of offset selected on the control unit, plus an identifying number as each specimen is tested. Testing machine can be operated manually if desired. *Tinius Olsen Testing Machine Co.*

For more data circle No. 35 on postcard, p. 117



High vacuum furnace heats to 2700° C

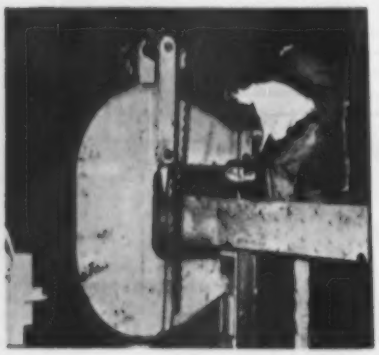
A high temperature, high vacuum production furnace operates to 2250 C with good element life, to 2700 C with reduced element life. Operating pressure can be maintained at less than one micron of mercury absolute. A movable heat shield permits observation or pyrometer readings through a sight port on the top cover, which is water-cooled. The furnace is recommended for all sintering operations and for vacuum treatment of electron tube parts at high temperature. The design of this high vacuum furnace is easily modified to take care of specific production problems. *Vacuum Specialties Co., Inc.*

For more data circle No. 36 on postcard, p. 117

Build-it-yourself crane assemblies

Crane assemblies offered for customer assembly, for reduced time, labor and shipping costs, include an underhung hand-geared crane, a top running hand-geared crane, and both single trolley and multiple trolley underhung push-type crane assemblies, each available on a package basis. Capacities range from ½-ton to 5 tons. *Conco Engineering Works.*

For more data circle No. 37 on postcard, p. 117



Mobile riveter provides 70-ton thrust

A special mobile hydraulic riveter provides 70 tons thrust for setting 1-in. hot rivets in reinforcing members on large bridge I-beams. The unit has a full stroke of 10 in. and a reach of 5 ft. Gap with anvil swiveled clear is 2 ft. Weight of riveter head is 9300 lb, and unit is powered by a 5 hp electric hydraulic pump. A hinged upper stationary rivet set can be swung out of the way to clear stiffening members as the riveter is moved along the I-beam during the riveting operation. Stroke of the machine is controlled by a 2-button remote control switch. The ram can be stopped at any position on return, permitting shortening of the cycle where full stroke is not required.—*Manco Mfg. Co.*

For more data circle No. 38 on postcard, p. 117

PROOF OF LIMA QUALITY
J & L's Lima is shown unloading coils of hot strip steel outside a warehouse at the Cleveland Works . . . just one of the wide variety of materials handling jobs assigned to this rugged, versatile machine.

J&L Steel's Cleveland Works reports:

"We get dependable materials handling mobility with our fast-moving wagon mounted Lima"

"Our rugged, fast-moving wagon mounted Lima crane makes materials handling equipment available fast *where* we need it, *when* we need it—in every corner of our plant." That's the report from Jones & Laughlin Steel Corporation's Cleveland Works. They've had a quality-built Lima wagon mounted Type 34 working at yard materials handling assignments since 1950. J & L's Lima first spent several years loading limestone at their blast furnaces . . . 24 hours a day, seven days a week without breakdown. In 1953 the machine had its only overhaul. A generator was added, and the Lima was magnetized. Since then, it's been used—with hook or magnet—to load and unload rails, scrap, castings, coil steel from the hot strip mill, and a variety of receivable materials in every part of the plant.

J & L says: "We really benefit from our Lima's mobility. It works in locations that can't be reached with other types of equipment. We move it all over the plant, sometimes a distance of 4 miles from one working location to another. Naturally, rapid movement is essential, and our Lima can really be moved quickly from job to job. That makes it possible for us to get maximum service from the machine during its operating periods.

"Performance has been excellent for all general requirements within the Lima's capacity. Maintenance costs have been at a minimum during five years' service."

Why not let a Lima help to solve *your* materials handling problems. Let us give you full details on the complete line of wagon, truck and crawler mounted Limas . . . designed and built with the emphasis on quality to give *you* perfect performance on every job. See your nearby Lima distributor, or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

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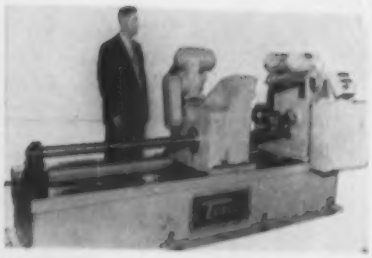


Double-end deburrer permits higher speeds

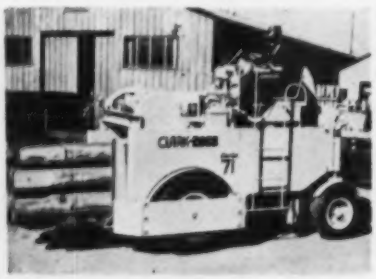
A new electric, double-end burring machine makes it possible to burr or chamfer both ends of a tube at the same time, at high speed. Tubing from ⅜-in. to 1¾-in. diam and from 3-in. to 72-in. length can be processed at rates in excess of 4500 pieces per hour. Radical stability is in excess of 10,000 lb. The movable head on the equipment is quickly positioned by a hand wheel and lead screw. Two ¾ hp variable speed drives with 8:1 ratios power the spindles. *Tubco Industries.*

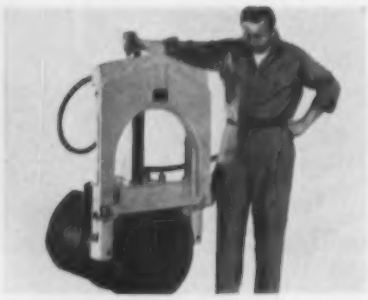
For more data circle No. 39 on postcard, p. 117

Straddle carrier offers synchromesh transmission

Synchromesh transmission, full hydraulic control of load hooks and the shortest turning radius of any carrier now available are the chief advantages claimed for the new Series 71 straddle carrier. The machine has a rated capacity of 10,000 lb, has a 90-in. wheelbase, and is available with either 130 or 91 hp engines, gas or LP-gas powered. Torque converter can be supplied as optional equipment. Road speed is 30 mph. Hoist speed is 2.8 seconds, 50 pct faster than that provided by previous Series 70 models. *Ross Carrier Div., Clark Equipment Co.*

For more data circle No. 40 on postcard, p. 117





Portable saw cuts pipe to 16-in.

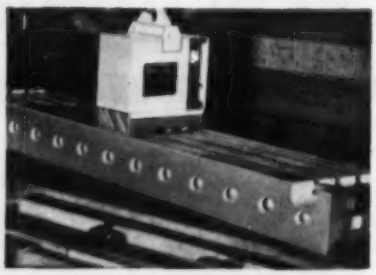
Faster, more accurate pipe-cutting is claimed for Big Guillotine, a new large capacity power pipe saw which cuts cast iron or steel pipe up to 16-in. diam, on the job, in a space only 32-in. wide. Double-chain pipe vise clamps saw to pipe, ready to cut, in a matter of seconds. Machined cast steel V saddle base assures a square cut at right angles to pipe. Pipe acts as machine tool base. Cutting time depends on pipe characteristics, but, as an example, 16-in. standard wall cast iron pipe cuts in 16 minutes. Sixteen inch ½-in. wall double extra heavy steel pipe can be cut with the improved saw in 20 minutes. *The E. H. Wachs Co.*

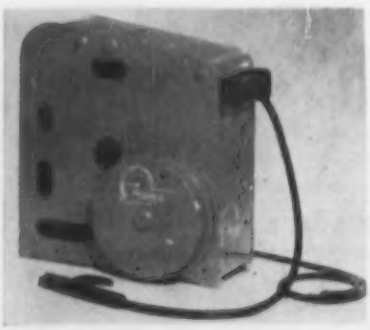
For more data circle No. 41 on postcard, p. 117

Lifting magnet is battery-operated

A 4000-lb capacity, battery-operated lifting magnet for inplant use is announced. Designated Model SI-4 Shop-Lifter, the 12-volt unit is said to be ideal for use on lift trucks, shop hoists, conveyor lines, etc., because, with batteries self-contained, there is no restriction as to length of haul because of electrical wires nor any danger of accident due to unexpected plant power supply failure. Magnetizing surface is 7-3/16 by 20-in. Automotive-type batteries need recharging only every 5 to 12 average workshifts. *The Ohio Electric Mfg. Co.*

For more data circle No. 42 on postcard, p. 117





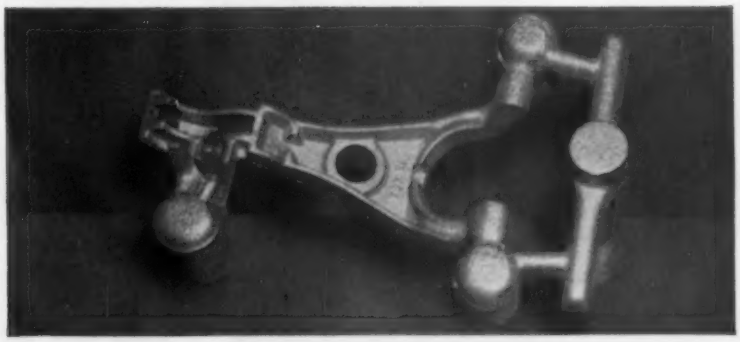
Welding cable reel takes in slack

Model EA welding cable reel, now available, handles up to 100 ft of 2/0 cable at 300 amps. A heavy duty spring and gear mechanism retracts cable when not in use. Cable may be locked at any desired length by means of a simple locking pawl arrangement. Construction of the reel permits mounting of the equipment in any position of the floors, walls or ceilings or on mobile equipment, according to the needs of the user. The reel was developed to increase plant safety by keeping work areas as uncluttered as possible as well as to extend cable life by keeping unused cable off the floor. *United Specialty Corp.*

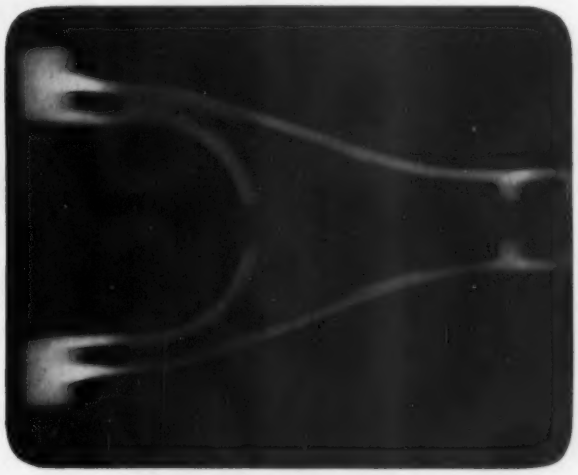
For more data circle No. 43 on postcard, p. 117

Turn Page

Shrink steals strength — and profits



— RADIOGRAPHY points the way to avoid it



THIS steel fork lever was designed to take a specific load. Would it hold up? Not if shrinkage had robbed its strength.

But here is where radiography came in with double-barreled effect. First the radiographs which were made showed the foundryman that internal shrinkage was present. Then the radiographs disclosed a recurring pattern of these defects, thus suggesting a change in molding which greatly reduced the difficulty.

This is typical of the ways radiography helps the foundryman make sure only satisfactory work is delivered and so builds a reputation for high-quality castings.

If you'd like to know how it can improve your own operations, talk it over with your x-ray dealer. Or, if you like, write us for a free copy of "Radiography as a Foundry Tool."

EASTMAN KODAK COMPANY, X-RAY DIVISION, ROCHESTER 4, N. Y.

Radiography

— another important example of Photography at Work

Kodak

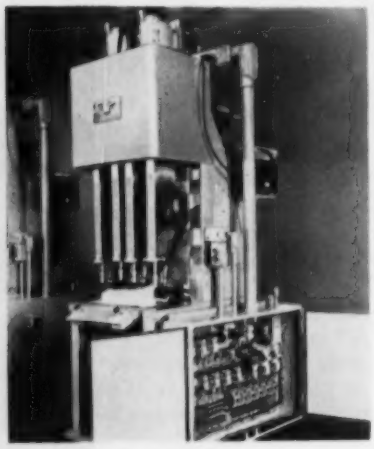
Temperature detectors

Platinum resistance temperature detectors that are small and have high speed response are offered for use in temperature measuring and control systems. The flexible detectors may be applied for temperature ranges from 330°F to 1380°F. Platinum sensing elements are hermetically sealed in pyrex or ceramic housings, are small size and capable of extremely high speed response. *Fielden Instrument Div., Robertshaw-Fulton Controls Co.*

For more data circle No. 44 on postcard, p. 117

Universal stud drivers

A number of studs can be driven simultaneously at various angles up to 30° from the vertical and at various heights to 12-in. above the table by a new line of universal stud driving machines. One model drives 1 to 6 studs, a second model drives up to 12 studs simultaneously. Production rate, from and to conveyor, is 4 to 6 seconds. Machine is extremely flexible and all heads can be changed to a new pattern in less than an hour. *Syracuse Special Machine Co.*

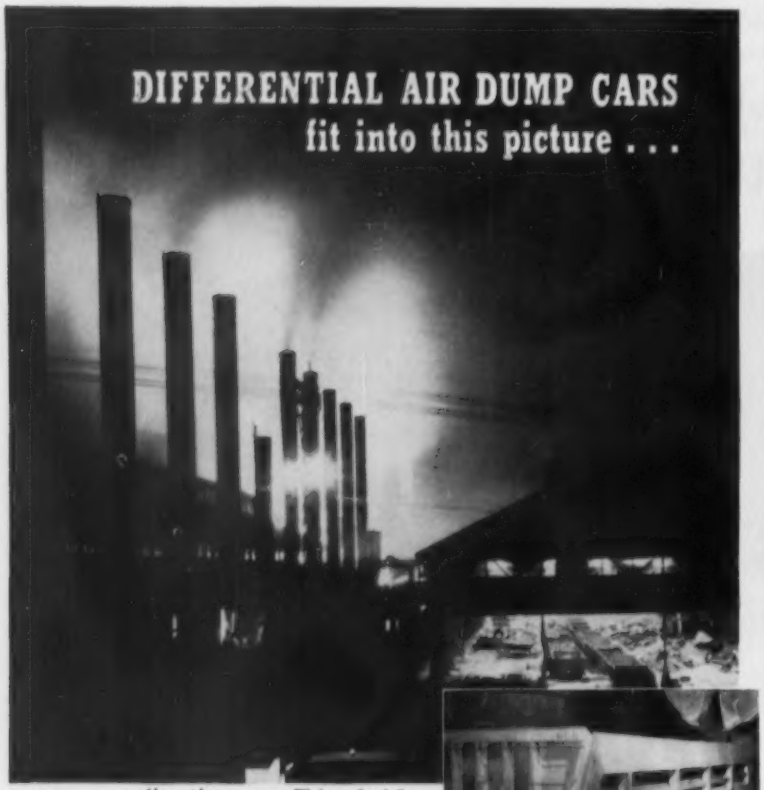


For more data circle No. 45 on postcard, p. 117

Speed reducer

A new combination helical and worm gear speed reducer drive for use in overhead, trolley, floor and pit-type conveyors and similar applications offers versatility in selecting input and output shaft locations. Reducer is mounted so that output shaft is horizontal or vertical, either up or down to suit mounting conditions, with input shaft at the horizontal right angle. Units are available in a wide range of output speeds. *Philadelphia Gear Works.*

For more data circle No. 46 on postcard, p. 117



Above photo courtesy Weirton Steel Co.

For day in, day out service — where the going is rough — where there's no place for weak sisters — more and more steel mills are choosing Differentials. Out at the dump they unload quickly and completely — will dump either way. Add up the score — you'll want Differentials in your line-up.

Differential Products Include:

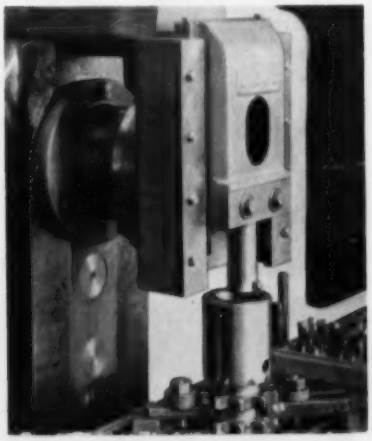
Air Dump Cars, Charging Box Cars, Ingot Mold Cars; Locomotives, Mine Cars, Mine Supply Cars, Rock Larries, Mantrip Cars, Dumping Devices and Complete Haulage Systems.

D
DIFFERENTIAL
STEEL CAR COMPANY
FINDLAY OHIO

SINCE 1915 PIONEERS IN HAULAGE EQUIPMENT

Slotting attachment

Keywaying, slotting, and die or fixture work requiring slotting operations, may be performed on a Greaves horizontal milling machine with a new slotting attachment. The unit mounts on the column face

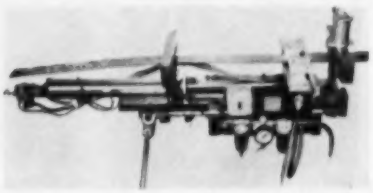


of the horizontal mill and is driven from the machine spindle. The heavy cast head may be rotated and set at any angle through 180°. It provides 4 in. maximum stroke through adjustable eccentric drive. The unit may be set for any cutting stroke between 0 and 4 in. Standard slotting tools with $\frac{5}{8}$ or 1 in. diam shanks may be used. *Greaves Machine Tool Div.*

For more data circle No. 47 on postcard, p. 117

Precision slide feeds

Easily adapted to any press, the new Micro-Air combines the accurate Microslide gripping principle with the flexibility of air. It will feed stock to practically unlimited feed lengths, has speed adjustments



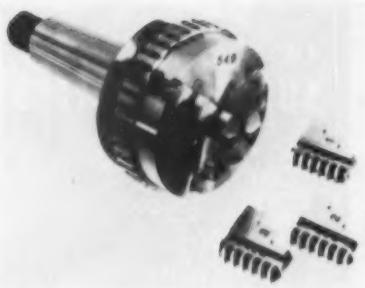
on both forward and return stroke, and has a built-in non-repeat feature which operates press. A pneumatic shock absorber on carriage and a safety foot valve with 2-position locking action are additional features. *Nadel Tool & Mfg. Co.*

For more data circle No. 48 on postcard, p. 117

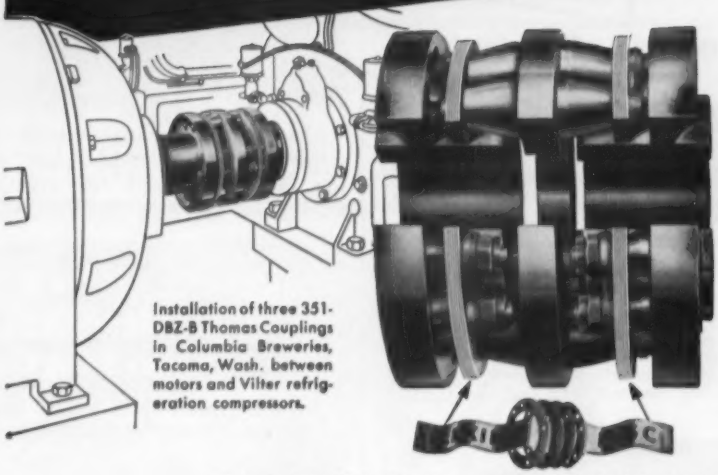
Precision chuck

Designed primarily for instrument and laboratory work, a precision 3-jaw chuck is guaranteed to have a repetitive accuracy to 0.0001-in. The unit comes with two sets of jaws and has a built-in drive pulley. Capacity is from 1/16 to 3-in. Shank is #4 Morse and has a $\frac{3}{8}$-in. hole. *Nife, Inc.*

For more data circle No. 49 on postcard, p. 117



THOMAS FLEXIBLE COUPLINGS...
for more years of better service!



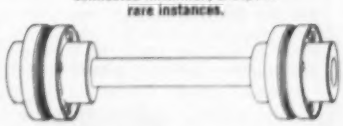
Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.

Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.



THOMAS

Write for our new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN, PENNSYLVANIA, U.S.A.

NOW TWO TYPES OF CHALLENGE SURFACE PLATES

NEW! CLOVIS BLACK GRANITE
Rated Class A. Surface accuracy guaranteed.

FINE GRAIN SPECIAL ANALYSIS SEMI-STEEL
Precision ground or hand-scraped

STILL ONE STANDARD OF CHALLENGE QUALITY!

Semi-Steel Layout Surface Plates

High compressive strength . . . Low coefficient of expansion. 16 standard sizes, 6" thick — other sizes to order. Also available for sectional assembly into unlimited sizes.

Cast-Iron Top Work Benches

Four sizes, three styles. For individual use or on a continuous line. With self-contained storage facilities.

Other Challenge Precision Products:
Clamp Edge Layout Plates • Reading Tables • Lapping Plates • Welding Tables • Surface Plates • Bench Plates • Surface Plate Equipment.

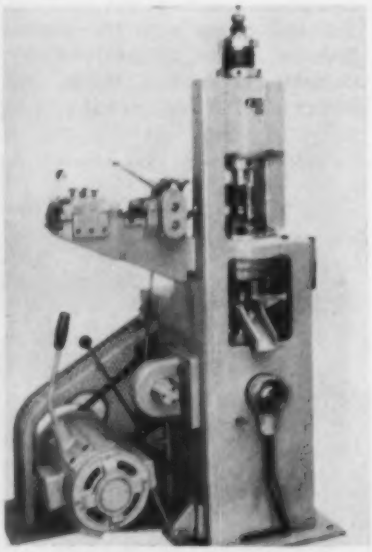
See the full line of Challenge Clovis Black Granite and Semi-Steel Surface Plates in the new Challenge Catalog. Send for your free copy today!

786 Challenge®

THE CHALLENGE MACHINERY CO.
Office, Factories and Show Room
GRAND HAVEN, MICH.

Blanking press

Completely enclosed, the new Essa BH-6 blanking press develops a pressure of 6 tons and is equipped



with a central pressure system. A complete elimination of "play" in the ram is claimed for greatly lengthened die life. *Carl Hirschmann Co., Inc.*

For more data circle No. 50 on postcard, p. 117

Portable liquid leveler

Applicable to all open-type liquid containers and operating in any electrically conductive liquid, a new

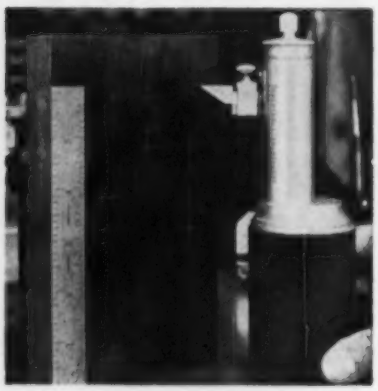
portable electronic liquid leveler automatically maintains bath mediums within a level constancy of ± 0.046-in. Operates on 115 v, 60 cycles. *Blue M Electric Co.*

For more data circle No. 51 on postcard, p. 117

Height gage

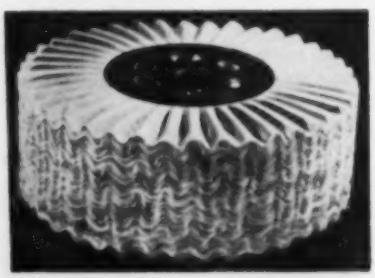
The Micro-Height Gage for laying out and inspecting metal dies reads like a micrometer without further calculations of any kind, and is claimed to be faster and more accurate than other height gages available. The basic gage has a 2-in. direct reading in thousandths which is easily increased to 3-in. by reversing the scriber. A 3-in. riser added to the base extends the gage's capacity to 6-in. To determine distances between heights or holes, a dial indicator is used in place of the steel scriber. *Greist Manufacturing Co.*

For more data circle No. 52 on postcard, p. 117



Bias buffs

Improvements offered in a new, different type of air-cooled bias buff include 45° angle fabric biasing, resulting in 23 pct more strong



warp fibers per inch of fabric on the working surface, and one-way warp direction for maximum cutting and polishing efficiency. Uniform convolution pleats and forced air ventilation are other features incorporated in the buff. *James H. Rhoades & Co.*

For more data circle No. 53 on postcard, p. 117

Heavy-duty barrel

A heavy-duty barrel for precision finishing of stamped, forged, machined or cast parts is built to tumble heavy parts and to operate for long runs. Octagonal compartments have internal dimensions of 19-in. across, flat to flat, by 9½-in. long. Compartments hold a total load of

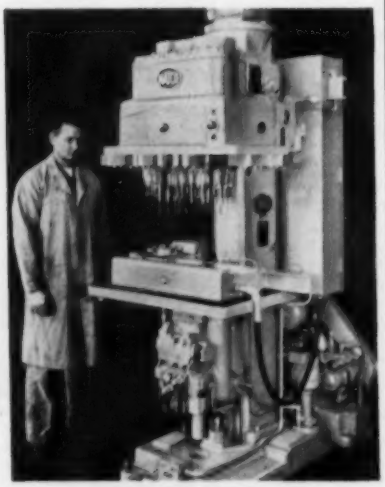
approximately 250-lb. A variable-speed drive that may be set over a range from 8 to 40 rpm provides flexibility for any finishing job. Model 200 stands 48-in. high, occupies floor space 31-in. deep by 38½-in. wide. *Lord Chemical Corp.*

For more data circle No. 54 on postcard, p. 117

Drilling machine

A new drilling machine combines the operations of three machines in one. The Natco H-6 adjustable, multi-spindle driller and tapper has a 3-position automatic fixture slide; drills, chamfers and taps holes automatically. *National Automatic Tool Co.*

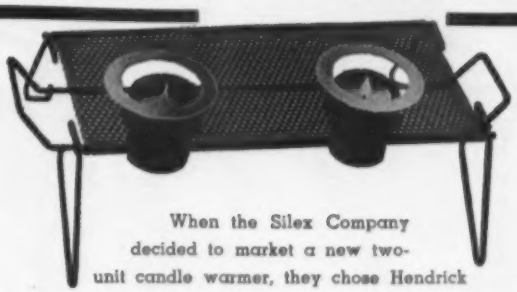
For more data circle No. 55 on postcard, p. 117



Silex Selects . . .

Hendrick Perforated Metal

for its new Coffee-Casserole Warmer



When the Silex Company decided to market a new two-unit candle warmer, they chose Hendrick Perforated Metal for the basic fabricating material. For Hendrick Perforated Metal not only helps increase a product's overall attractiveness, but it increases saleability as well. Select from hundreds of attractive designs in commercially rolled metals and gauges to suit your more exacting requirements.

Hendrick

MANUFACTURING COMPANY

37 DUNDAFF ST., CARBONDALE, PA. • Sales Offices in Principal Cities

Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Architectural Grilles • Mitco Open Steel Flooring • Shur-Site Treads • Armorgrids

"Most Efficient Yard Crane We've Used"

Says

Henry J. Hettinger

Asst. Supt. in Charge of Maintenance

Greenpoint Works

Brooklyn Union Gas Co

KARRI-GO

FRONT-BOOM MOBILE CRANE

5 and 7½ Ton Cap.

FEATURE: *"Live Boom" with Hydraulic Power Topping*

"Our **KARRI-GO** saves us time and money," says Mr. Hettinger. "The short turning radius makes it very flexible. It does many jobs faster, more economically than our three big cranes. We use it indoors and outdoors . . . for removing and installing underground cable, 12" pipe, valves, large valve bonnets and gates. On repairs, the **KARRI-GO** carries motors, speed-reducers, compressors, pumps, and other machinery to and from the machine shop. Handles reels, 55-gal. drums, steel beams and forms; it loads and unloads trucks; stacks materials for storage. This **KARRI-GO** has to cover a lot of ground . . . the area of our yard is over 115 acres. To carry bigger loads and cut down travel trips, we often attach a trailer to the pintle hook. Doing a fine job here."

Send for Bulletin #73C

Mfrs. of KRANE KAR Swing-Boom Mobile Crane

SILENT HOIST & CRANE CO. 851 63rd ST., BROOKLYN 20, N.Y.

Good News about Titanium!

SUPERIOR TITANIUM TUBING NOW AVAILABLE IN A WIDE RANGE OF SIZES, FORMS, TEMPERS

The big news about titanium these days is not its high strength to weight ratio; its formability; its corrosion, heat and electrical resistance. Engineers know all this. What they want to know is *when*. The answer is *right now*, as far as tubing is concerned.

Although everything is special as far as the production of titanium tubing is concerned—more grinding operations are required, special lubricants have to be employed, drawing schedules have to be much lighter, annealing must be done in special furnaces, special pickling solutions are demanded—the end result is always a standard tubing obtainable from Superior distributors coast to coast. Sizes range in O.D. from .012" up to 1.50", in wall thickness from .002" to .187", and in lengths up to 24 feet. Tempers—fully annealed, half hard and full hard. Forms—Seamless and Weldrawn®.

Applications are increasing rapidly. They now range from use in the atomic energy programs—to low stress aircraft structural parts—to pneumatic, hydraulic, refrigeration lines—to processing lines in the chemical industry.

Write now for your free copy of Bulletin 43—it contains complete technical and ordering information—and for the name of the Superior distributor nearest you. SUPERIOR TUBE COMPANY, 2004 Germantown Ave., Norristown, Pa. *On the West Coast:* Pacific Tube Company, 5710 Smithway St., Los Angeles 22, Calif.

Round and shaped tubing available in Carbon, Alloy and Stainless Steels; Nickel and Nickel Alloys; Beryllium Copper; Titanium; Zirconium

Superior Tube

The big name in small tubing

All analyses .010" to ⅝" O.D. Certain analyses in light walls up to 2½" O.D.

Titanium is reactive, must be heat treated without atmospheric contamination. This vacuum annealing furnace handles material 24 feet in length, operates at temperatures up to 1650°F, is automatically controlled.

All you need to know about titanium tubing is contained in this newly revised 8-page booklet—Bulletin 43. Contains processing information, properties, advantages and end uses, describes sizes, forms and tempers available.

The Iron Age SUMMARY . . .

Steel market in state of near-confusion . . . Worried consumers turn to conversion and warehouse . . . Gray market talk . . . Demand outlook strong.

Trouble Looms . . . The booming steel market is dangerously close to confusion. Producers are straining to maintain control, but signs of trouble are beginning to appear.

More consumers may be forced to cut back operations for lack of steel. Two large Midwestern manufacturers are setting up costly conversion arrangements. Warehouses are fighting off customers who normally buy direct from the mills.

There's even talk of gray market again. But if the daisy-chain boys are getting much business, it's a well-hidden operation. IRON AGE sources say the situation hasn't reached that point—yet. But conditions are ripe. Steel brokers already are charging premiums for off-grade material.

Everybody has a bad case of the jitters. Here are a few of the problems that have producers and consumers worried:

(1) No likelihood of a downturn in demand until latter half of 1956—if then; (2) possibility of labor trouble when steel union contracts come up for renewal next summer, and (3) mill and furnace breakdowns.

Conversion In Autos . . . The auto companies are upping their requirements by as much as 15 pct. Appliance people are asking for about 20 pct more. Allocations by the mills are forcing some auto firms into conversion, where semifinished material is bought from one mill and finished by another.

Equipment breakdowns and normal wear and tear are a serious problem for producers. Instances are scattered, but taken together, thousands of tons of finished steel are lost. Blast furnace repairs and open hearth rebuilds are threatening raw steel output.

For producers, it's like a dog chasing his tail. They're trying to expand their own capacity, and in the process are running into steel procurement problems for their contractors. The structural market is particularly tight.

Warehouse Problem . . . The drain on warehouse stocks is more than serious. Some distributors are sold out on certain sizes and gages of tight products. Deliveries from the mill are slow and warehouse orders have been cut. One large warehouse reports its inventories down to an average of 45 days on the basis of current volume.

Steel producers last week set a new record of 2,413,000 tons, operating at 100 pct of capacity. Operations for week: estimated 98.5 pct.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,370	2,413	2,340	1,845
Ingot Index				
(1947-1949=100)	147.5	150.2	145.5	114.7
Operating Rates				
Chicago	98.5	97.5	96.5	79.0
Pittsburgh	103.0	105.0*	100.0	74.0
Philadelphia	105.0	104.0*	98.0	68.5
Valley	97.0	99.0	95.0	71.0
West	99.5	98.5*	73.0	83.0
Detroit	94.0	95.0	97.0	97.0
Buffalo	105.0	105.0	105.0	87.5
Cleveland	102.5	104.0*	102.0	81.0
Birmingham	94.0	94.0	96.0	64.5
S. Ohio River	90.0	92.0*	91.5	87.0
Wheeling	101.0	100.0*	101.0	81.0
St. Louis	106.0	97.0	99.0	91.0
Northeast	97.0	97.0	89.0	45.0
Aggregate	98.5	100.0	97.0	76.5

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.174	5.174	5.174	4.798
Pig Iron (Gross Ton)	$59.09	$59.09	$59.09	$56.59
Scrap, No. 1 hvy (gross ton)	$44.50	$44.50	$44.17	$33.33
Nonferrous				
Aluminum ingot	24.40	24.40	24.40	22.20
Copper, electrolytic	43.00	43.00	43.00	30.00
Lead, St. Louis	15.30	15.30	15.30	14.80
Magnesium, ingot	33.25	33.25	33.25	27.75
Nickel, electrolytic	64.50	64.50	64.50	63.08
Tin, Straits, N. Y.	96.625	96.50	92.25	92.375
Zinc, E. St. Louis	13.00	13.00	13.00	11.50

STEEL PRODUCT MARKETS

Warehouse Plight Is Typical

Inventories, reduced mill deliveries still the biggest headaches . . . Finished steel shortages cut down on overall sales highs . . . Sheet, plate, structurals tight.

◆ UPS AND DOWNS of the year's product picture have never been more clearly reflected than in warehouse activity.

No matter which side of the continent, reports agree: "Warehouse business would be the best in history—if they had the steel to sell." The "if" at the present time is a key word, both to the large and small warehouse operators as well as the hard-pressed consumers of just about every steel product.

Latest indications are that customer banging on warehouse doors is a loud noise everywhere. A West Coast warehouseman says: "Our only trouble is getting enough from the mills so we can keep customers reasonably happy."

In Detroit, warehouse inventories are still the biggest worry. Warehouse inventories are reaching the danger point. In Pittsburgh, shelves are empty on most tight items.

Chicago and Cleveland note that: (1) right now, incoming mill deliveries are pegged to tonnages received last year—a relatively poor selling year for most warehouses; (2) in the face of strong customer demand these mill allocations are nowhere near satisfactory in helping warehouses maintain a good mix on such products as hot-rolled and cold-rolled sheets, alloy bars, heavy and light gage plates, standard and wide flange beams.

Warehouses have already been told by the mills to expect less in the way of finished steel tonnage early next year. While dollar-wise, this will certainly be among the best years in warehouse history, mill delivery snafus prevent warehouses from getting the full benefit.

American Steel & Wire Co. announces size extras on rods from 35/64ths in. and smaller. Previously, there were three categories with price extras which have now been expanded to five categories.

Northeastern Steel Corp. has adopted an escalator system of pricing applicable to hot-rolled carbon strip, plates, and flats. Prices will fluctuate on the basis of IRON AGE scrap quotations in the Boston market. Rising scrap prices and the company's complete dependence on scrap as a raw material for its furnaces made the move necessary. On this basis, prices of the three products will be up $9 per ton in November. Further increases or decreases will depend on changes in Boston scrap prices.

SHEETS AND STRIP . . . No letup in demand from **Detroit's** auto industry. Major auto firms have increased production schedules, adding more confusion to an already bad situation. Mills are doing their best to take care of heavy volume auto orders for hot and cold-rolled sheet, but it's estimated carryovers will probably run over into second quarter. Mill order books in **Cleveland** are booked solidly on cold-rolled sheet for first quarter. One major producer had hopes of "dropping" a second month in first quarter to get current on deliveries. Most mills already plan to drop at least one month. Deliveries are running 7 to 8 weeks late on most cold-rolled coils for autos. Average deliveries on sheet and strip in **Pittsburgh** reportedly are running 11 weeks behind. Major consumer inventories are said to be down to between 9 and 30 days. Hard-pressed consumers are buying warehouse tonnages in larger quantities than ever before. In the **East**, one large producer has yet to open first quarter order books.

BARS . . . In **Pittsburgh** and the **East**, bar deliveries are running at anywhere from six to seven weeks late. Not too much play at the warehouse level for bar to date because customer inventories are in pretty good shape at the moment. In **Detroit**, however, auto output stepups have put a tight squeeze on bar deliveries, expected to go into first quarter showing extended carryovers from fourth quarter. **Chicago** reports warehouse stocks of half-inch to 2-in bar stock virtually exhausted. Customer inventories in these sizes are just about as bad.

PLATES . . . **Pittsburgh** plate deliveries are running about 10 weeks in arrears. Customer inventories are said to be down anywhere from 50 to 75 pct of "normal" levels. Warehouses can't help out too much, especially where individual plate orders call for good amounts of tonnage. Don't look for any substantial betterment of light gage plate deliveries in **Detroit**. Situation is expected to remain very critical on all size of plate well into next year. In the **East**, a mounting volume of customer cries for both heavy and light gage plate still finds mill deliveries running behind 1 to 2 months. Same pattern is almost sure to continue well into the next quarter.

STRUCTURALS . . . Consumer inventories in **Pittsburgh** remain in better shape than in most other grades. Warehouses, however, are down to zero on structural stocks. Plans for new construction have been affected to the extent that buildings slated for erection starts in March have been pushed back to June. **West Coast** structural sales are reported showing increased activity. Behind the demand: new plants, office buildings, new bridges and highways. In the **East**, delivery of wide-flange beams and standard sections is running late by at least six weeks. Pattern will carryover similarly into the first quarter.

Purchasing Agent's Checklist:

INDUSTRY: TV's role is growing p. 55

MACHINES: Office machines getting more complex, pose problems ..... p. 59

COPPER: New sources may open up in Chile ..... p. 60

Comparison of Prices

(Effective Nov. 1, 1955)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Nov. 1 1955	Oct. 25 1955	Oct. 4 1955	Nov. 2 1954
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.325¢	4.325¢	4.325¢	4.05¢
Cold-rolled sheets	5.325	5.325	5.325	4.95
Galvanized sheets (10 ga.)	5.85	5.85	5.85	5.45
Hot-rolled strip	4.325	4.325	4.325	4.05
Cold-rolled strip	6.29	6.29	6.29	5.82
Plate	4.52	4.52	4.52	4.225
Plates wrought iron	9.30	9.30	9.30	9.30
Stainl's C-R strip (No. 302)	44.50	44.50	44.50	41.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$9.05	$9.05	$9.05	$9.05
Tinplate, electro (0.50 lb.)	7.75	7.75	7.75	7.75
Special coated mfg. ternes	7.85	7.85	7.85	7.85
Bars and Shapes: (per pound)				
Merchant bars	4.65¢	4.65¢	4.65¢	4.30¢
Cold finished bars	5.90	5.90	5.90	5.40
Alloy bars	5.65	5.65	5.65	5.075
Structural shapes	4.60	4.60	4.60	4.25
Stainless bars (No. 302)	38.25	38.25	38.25	35.50
Wrought iron bars	10.40	10.40	10.40	10.40
Wire: (per pound)				
Bright wire	6.25¢	6.25¢	6.25¢	5.75¢
Rails: (per 100 lb.)				
Heavy rails	$4.725	$4.725	$4.725	$4.45
Light rails	5.65	5.65	5.65	5.35
Semifinish Steel: (per net ton)				
Rerolling billets	$68.50	$68.50	$68.50	$64.00
Slabs, rerolling	68.50	68.50	68.50	64.00
Forging billets	84.50	84.50	84.50	78.00
Alloy blooms, billets, slabs	96.00	96.00	96.00	86.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.025¢	5.025¢	5.025¢	4.675¢
Skelp	4.225	4.225	4.225	3.90
Finished Steel Composite: (per pound)				
Base price	5.174¢	5.174¢	5.174¢	4.798¢

	Nov. 1 1955	Oct. 25 1955	Oct. 4 1955	Nov. 2 1954
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$63.69	$63.69	$63.69	$61.19
Foundry, Valley	59.00	59.00	59.00	56.50
Foundry, Southern, Cin'ti	62.93	62.93	62.93	60.43
Foundry, Birmingham	55.00	55.00	55.00	52.88
Foundry, Chicago	59.00	59.00	59.00	56.50
Basic, del'd Philadelphia	62.77	62.77	62.77	60.27
Basic, Valley furnace	58.50	58.50	58.50	56.00
Malleable, Chicago	59.00	59.00	59.00	56.50
Malleable, Valley	59.00	59.00	59.00	56.50
Ferromanganese‡, cents per lb.	9.50¢	9.50¢	9.50¢	9.50¢
‡ 74-76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig iron	$59.09	$59.09	$59.09	$56.59
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$44.50	$44.50	$44.50	$34.50
No. 1 steel, Phila. area	46.50	46.50	46.50	32.00
No. 1 steel, Chicago	42.50	42.50	43.50	33.50
No. 1 bundles, Detroit	39.00	39.00	39.00	26.50
Low phos., Youngstown	49.00	49.00	47.50	35.50
No. 1 mach'y cast, Pittsburgh	50.50	50.50	46.50	42.50
No. 1 mach'y cast, Philadel'a	48.50	47.50	47.50	42.50
No. 1 mach'y cast, Chicago	52.50	52.50	53.50	43.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$44.50	$44.50	$44.83	$33.33
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.25	$13.25	$13.25	$14.38
Foundry coke, prompt	16.25	16.25	16.25	16.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	43.00	43.00	43.00	30.00
Copper, Lake, Conn.	43.00	43.00	43.00	30.00
Tin, Straits, New York	96.625	96.50	96.25	92.375
Zinc, East St. Louis	13.00	13.00	13.00	11.50
Lead, St. Louis	15.30	15.30	15.30	14.80
Aluminum, virgin ingot	24.40	24.40	24.40	22.20
Nickel, electrolytic	64.50	64.50	64.50	63.08
Magnesium, ingot	33.25	33.25	33.25	27.75
Antimony, Laredo, Tex.	33.00	33.00	33.00	28.50

† Tentative. ‡ Average. • Revised.

Finished Steel Composite
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite
Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on P. 124→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	60.50	61.00	61.50	62.00	.....
Birdsboro, Pa. *B6*	60.50	61.00	61.50	62.00	.....
Birmingham *R3*	54.50	55.00*	.....	.....	.....
Birmingham *W9*	54.50	55.00*	59.00	.....	.....
Birmingham *U4*	54.50	55.00*	59.00	.....	.....
Buffalo *R3*	58.50	59.00	59.50	.....	.....
Buffalo *H1*	58.50	59.00	59.50	.....	.....
Buffalo *W6*	58.50	59.00	59.50	60.00	.....
Chester *C17*	60.50	61.00	61.50	.....	.....
Chicago *I4*	58.50	59.00	59.00	59.50	.....
Cleveland *A5*	58.50	59.00	59.00	59.50	63.50
Cleveland *R3*	58.50	59.00	59.00	.....	.....
Duluth *I4*	58.50	59.00	59.00	59.50	.....
Erie *I4*	58.50	59.00	59.00	59.50	.....
Everett *M6*	.....	61.00	61.50	.....	.....
Fontana *K1*	64.50	65.00	.....	.....	.....
Geneva, Utah *C7*	58.50	59.00	.....	.....	.....
Granite City *G2*	60.40	60.90	61.40	.....	.....
Hubbard *Y1*	.....	.....	59.00	.....	.....
Lone Star *L3*	.....	55.00	.....	.....	.....
Minnequa *C6*	60.50	61.00	61.50	.....	.....
Monessen *P6*	58.50	.....	.....	.....	.....
Neville Is. *P4*	58.50	59.00	59.00	.....	.....
N. Tonawanda *T1*	.....	59.00	59.50	.....	.....
Pittsburgh *U1*	58.50	.....	.....	59.50	.....
Sharpsville *S3*	58.50	59.00	59.00	59.50	.....
So. Chicago *R3*	58.50	.....	59.00	.....	.....
Steelton *B3*	60.50	61.00	61.50	62.00	66.50
Swedeland *A2*	60.50	61.00	61.50	62.00	.....
Toledo *I4*	58.50	59.00	59.00	59.50	.....
Troy, N. Y. *R3*	60.50	61.00	61.50	62.00	66.50
Youngstown *Y1*	.....	.....	59.00	59.50	.....

DIFFERENTIALS: Add, 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional, 0.25 pct nickel. *Add $1.00 for 0.31-0.49 pct phos.

Silvery Iron: Buffalo, *H1*, $66.75; Jackson, *J1*, *G1*, $67.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	17.75	19.00	—	20.25	31.50	25.00	33.75	15.00	—	15.25
Slabs, billets, rerolling	22.25	24.75	26.75	26.00	40.25	32.00	43.00	19.50	—	19.75
Forg. discs, die blocks, rings	—	—	—	—	—	—	—	—	—	—
Billets, forging	31.75	32.00	34.75	33.75	51.25	38.25	51.00	25.50	26.00	26.00
Bars, wires, structurals	38.00	38.25	41.00	40.25	60.75	45.25	60.00	30.50	31.00	31.00
Plates	40.00	40.25	42.75	43.00	64.00	49.25	64.75	31.75	33.00	32.25
Sheets	44.25	44.50	—	47.25	68.25	54.25	73.50	36.25	—	36.75
Strip, hot-rolled	32.00	34.50	—	37.25	58.25	44.25	50.75	—	—	—
Strip, cold-rolled	41.00	44.50	—	47.25	68.25	54.25	73.50	36.25	—	36.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; McKeesport, Pa., *U1*; Washington, Pa., *W2*, *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *J4*; Philadelphia, *D5*.

Strip: Midland, Pa., *C11*; Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Middletown, O., *A7*; Harrison, N. J., *D3*; Youngstown, *C5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (.25¢ per lb higher); *W1* (.25¢ per lb higher); New Bedford, Mass., *R6*.

Bar: Baltimore, *A7*; Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*; Ft. Wayne, *I4*; Philadelphia, *D5*; Detroit, *R5*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Philadelphia, *D5*.

Forged discs, die blocks, rings: Pittsburgh, *C11*; Syracuse, *C11*; Ferndale, Mich., *A3*; Washington, Pa., *J2*.

Forgings billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3* Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R5*.

IRON AND STEEL SCRAP MARKETS

Threat of Market Break Fades

Chicago prices stiffen after slide . . . Pittsburgh reports stepped-up activity at going prices . . . Steelmaking grades advance in Buffalo, Boston.

◆ LAST WEEK'S threat of a market break has faded.

Chicago, which showed weakness last week, reported most prices holding and a few advancing. A wave of new buying is expected there within another week.

In Pittsburgh, new buying strengthened going prices. New orders were light but they marked the end of a complete standstill and dispelled any notion of weakening prices.

Steelmaking grades advanced $1 to $2 in Buffalo as a major area mill bought locally for the first time in about a year. Boston prices inched up on moderate activity. Philadelphia reported scattered price gains and continued steady activity.

THE IRON AGE Composite for No. 1 heavy melting steel scrap remains $44.50.

Pittsburgh . . . Openhearth scrap activity increased temporarily following a couple of transactions by a large consumer. Small tonnages of No. 1 and No. 2 heavy melting were purchased at $45.50 and $41.-50. Since these tonnages carry a 50¢ freight differential, there is no change in prices. A larger tonnage of No. 2 bundles was purchased at $37, down a dollar from the previous price. A consumer on the fringe of the district purchased a representative tonnage of openhearth scrap in line with current prices. The combined tonnages didn't amount to much, but did have a stabilizing effect on the market. A tonnage order of industrial bundles was placed at about $49, up from last month's prices and further reflects the growing strength in premium grade scrap. Blast furnace grades remain unchanged, but shipments to a major consumer are being held up due to mechanical difficulties with unloading equipment. Other grades held unchanged.

Chicago . . . Chicago scrap is digging in its feet after the temporary slide. Local prices have leveled and a few grades are showing greater strength. Turnings, weakest grade on the list, are drawing higher asking prices and continue to drain out of the area to other mills. Coupled with reports that cutbacks were expected in available blast furnace capacity, this seemed to put a little more pep in the grade. Electric furnace continued strong and new mill purchases put a floor under steelmaking grades. Cast was exhibiting some strength. A fresh wave of mill purchasing is expected within another week.

Philadelphia . . . Steady price levels continue to hold. Top steelmaking grades are reported strong at current quotations, with no significant variations looked for in the immediate days ahead. A slight strengthening in shoveling turnings is noted—up $1 over week earlier levels. Similar stronger showings are reported in the already healthy cast market with prices on cast iron car wheels and No. 1 machinery cast up $1 over earlier quotations.

New York . . . "Just humming along" is the way one broker describes this market. Prices are at high levels and both domestic and export business is strong. But another broker points out that the scrap industry is operating at practically 100 pct of capacity, and warns that at this rate higher prices may be forced on the industry if demand keeps up. A large consumer in an adjacent district has set the price of No. 2 bundles at $32.00 to $33.00. Cast grades have risen $1 to $40.00.

Detroit . . . Prices on the November auto lists remained relatively stable with the exception of turnings which were a little softer. No buying has taken place yet and local mills are expected to pay the same prices if they do come into the market.

Cleveland . . . Local automotive bundles went for almost identical prices as previous month or slightly over $45 local. Tonnages were spread among many brokers and a high percentage is destined for out-of-town use. In the Valley one mill repeated an earlier order at $41 for No. 2 heavy melting and $36 for No. 2 bundles. Another paid $48 for No. 1 heavy melting dealer scrap and $1 higher for industrial. Two other fringe area mills paid $48.50 for No. 1 heavy melting and another paid $49 with special low phos premium.

Birmingham . . . The Anniston Ordnance Depot at Anniston, Ala., sold a considerable amount of scrap of various grades this week at prices considerably above the currently quoted markets. The premium prices are due partly to broker speculation and partly due to increased strength in the specialty markets. Dealers report the flow of scrap into the yards has improved.

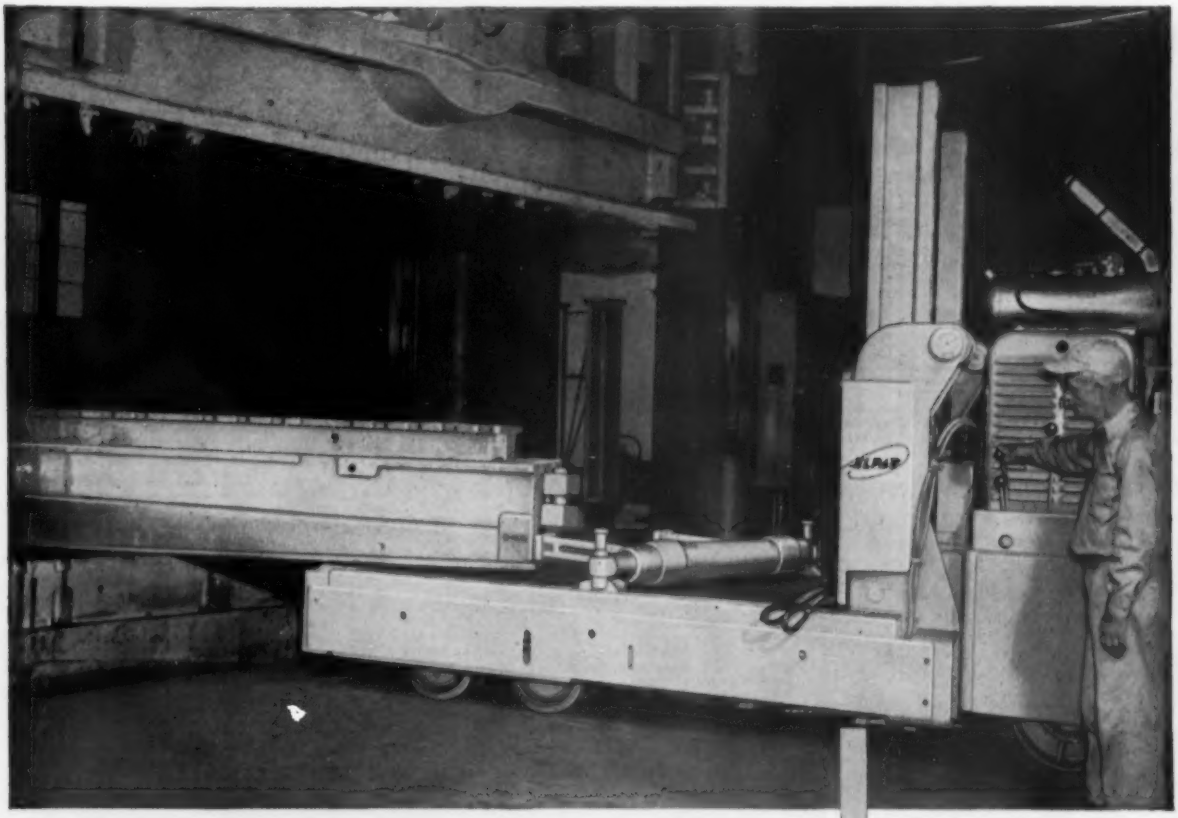
St. Louis . . . Steel operating rate jumped during the week to 106.1 pct. Buying prices by the steel mills will remain at present levels for November. Receipts for October were slightly ahead of the melt, with November results expected to be the same. Weather conditions are excellent for the collection of scrap.

Cincinnati . . . Nearby mill purchased 30,000 tons of regular monthly factory bundles at same price as last month, scotching rumors of weakness in area. One mill in area rejected large percentage of cars in which turnings had alloy content. Out-of-town movement has died down pending announcement of buying program by area mill.

Buffalo . . . Prices of steelmaking grades advanced $1 to $2 here as the market showed renewed activity. One major mill bought locally for the first time in about a year. Another is expected to come in next week.

Boston . . . Moderate activity and improving prices mark the Boston area. Steelmaking grades moved up 50¢. Cast grades were up $1 to $2. Export continues steady.

West Coast . . . Mills still keeping worried eye on heavy exporting. Recent hefty price hikes haven't increased the flow of scrap to mills—simply assured loyalty of current suppliers. Kaiser Steel Corp. selling 110,000 tons of pig iron to Japan within a year.



ELPAR truck in Lockheed aircraft plant. Note that operator is using remote controls. Die is being turned as it is pushed into press. *In only 8 minutes,* truck picks up from storage, delivers, and positions a multi-ton die!

Exclusive Features of NEW ELPAR* Die Handler

Speed Die Changing

Fast changing of stamping and forging dies is a "must" to keep waiting time of huge presses at a minimum. The entirely new line of ELPAR die puller trucks handles 5 to 50-ton dies with unmatched speed and safety. Here are some of the reasons:—

FINGERTIP CONTROL—Exclusive *hydraulic* operation of *both* lift and die pulling mechanism permits "*inching*" action. Hydraulic valves can be barely cracked to permit accurate positioning of platform and alignment of die in press. Such exactness is impossible with electric controls.

INDEPENDENT OPERATION OF PUSHER ARMS—Pusher arms can operate together or separately to maneuver die. If necessary, a die can be pushed off diagonally even when platform is not square with press bed. This saves time of maneuvering truck. Die can be turned as it is pushed into press.

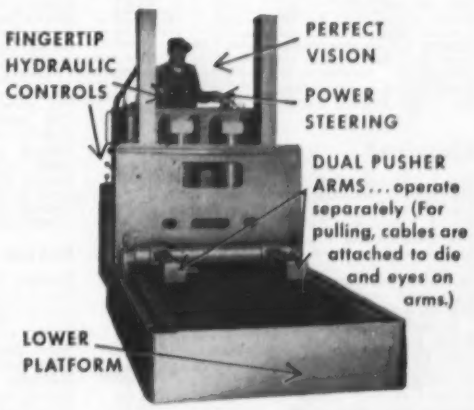
LOWER PLATFORM—Because today's press beds are lower, ELPAR trucks provide lowest possible platform with no sacrifice in capacity.

FULL VISION—No lift chains or cables between uprights, and no cross member at top. End control permits view of entire truck.

MANEUVERABILITY—Effortless hydraulic power steer. Short turning radius because all wheels steer.

*Elwell-Parker trademark.

ELPAR FEATURES:


FINGERTIP HYDRAULIC CONTROLS
PERFECT VISION
POWER STEERING
DUAL PUSHER ARMS... operate separately (For pulling, cables are attached to die and eyes on arms.)
LOWER PLATFORM

THE ELWELL-PARKER ELECTRIC CO.
4299 St. Clair Avenue Cleveland 3, Ohio

ASK FOR FULL FACTS ON NEW ELPAR DIE PULLERS

Scrap Prices *(Effective Nov. 1, 1955)*

Pittsburgh

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	44.00 to 45.00
No. 2 bundles	36.00 to 37.00
Machine shop turn.	30.00 to 31.00
Mixed bor. and ms. turns.	30.00 to 31.00
Shoveling turnings	33.00 to 34.00
Cast iron borings	33.00 to 34.00
Low phos. punch'gs, plate	49.00 to 50.00
Heavy turnings	42.00 to 43.00
No. 1 RR. hvy. melting	48.00 to 49.00
Scrap rails, random lgth.	54.00 to 55.00
Rails 2 ft and under	59.00 to 60.00
RR. steel wheels	53.00 to 54.00
RR. spring steel	53.00 to 54.00
RR. couplers and knuckles	53.00 to 54.00
No. 1 machinery cast.	50.00 to 51.00
Cupola cast.	42.00 to 43.00
Heavy breakable cast.	40.00 to 41.00

Chicago

No. 1 hvy. melting	$42.00 to $43.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 factory bundles	46.00 to 47.00
No. 1 dealers' bundles	42.00 to 43.00
No. 2 dealers' bundles	33.00 to 34.00
Machine shop turn.	27.00 to 28.00
Mixed bor. and turn.	29.00 to 30.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. forge crops	52.00 to 53.00
Low phos. punch'gs, plate	49.00 to 50.00
Low phos. 2 ft and under	48.00 to 49.00
No. 1 RR. hvy. melting	48.00 to 49.00
Scrap rails, random lgth.	55.00 to 56.00
Rerolling rails	66.00 to 67.00
Rails 2 ft and under	60.00 to 61.00
Locomotive tires, cut	51.00 to 52.00
Cut bolsters & side frames	53.00 to 54.00
Angles and splice bars	57.00 to 58.00
RR. steel car axles	56.00 to 57.00
RR. couplers and knuckles	51.00 to 52.00
No. 1 machinery cast.	52.00 to 53.00
Cupola cast.	48.00 to 49.00
Heavy breakable cast.	40.00 to 41.00
Cast iron brake shoes	38.00 to 39.00
Cast iron car wheels	46.00 to 47.00
Malleable	57.00 to 58.00
Stove plate	39.00 to 40.00

Philadelphia Area

No. 1 hvy. melting	$46.00 to $47.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	46.00 to 47.00
No. 2 bundles	37.00 to 38.00
Machine shop turn.	28.50 to 29.50
Mixed bor. short turn.	28.50 to 29.50
Cast iron borings	28.50 to 29.50
Shoveling turnings	31.00 to 32.00
Clean cast chem. borings	35.00 to 36.00
Low phos. 5 ft and under	48.00 to 49.00
Low phos. 2 ft and under	49.00 to 50.00
Low phos. punch'gs	49.00 to 50.00
Elec. furnace bundles	47.00 to 48.00
Heavy turnings	42.00 to 43.00
RR. steel wheels	51.00 to 52.00
RR. spring steel	51.00 to 52.00
Rails 18 in. and under	59.00 to 60.00
Cupola cast.	41.00 to 42.00
Heavy breakable cast.	45.00 to 46.00
Cast iron car wheels	52.00 to 53.00
Malleable	58.00 to 59.00
Unstripped motor blocks	29.00 to 31.00
No. 1 machinery cast.	48.00 to 49.00

Cleveland

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 bundles	45.00 to 46.00
No. 2 bundles	36.00 to 37.00
No. 1 busheling	45.00 to 46.00
Machine shop turn.	25.00 to 26.00
Mixed bor. and turn.	28.50 to 29.50
Shoveling turnings	28.50 to 29.50
Cast iron borings	28.50 to 29.50
Cut struct'r'l & plates, 2 ft & under	48.50 to 49.50
Drop forge flashings	43.00 to 44.00
Low phos. punch'gs, plate	46.00 to 47.00
Foundry steel, 2 ft & under	47.50 to 48.50
No. 1 RR. heavy melting	48.50 to 49.50
Rails 2 ft and under	61.00 to 62.00
Rails 18 in. and under	62.00 to 63.00
Railroad grate bars	37.00 to 38.00
Steel axle turnings	30.00 to 31.00
Railroad cast.	49.00 to 50.00
No. 1 machinery cast.	49.00 to 50.00
Stove plate	45.00 to 46.00
Malleable	51.00 to 52.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	$47.50 to $48.50
No. 2 hvy. melting	41.00 to 42.00
No. 1 bundles	47.50 to 48.50
No. 2 bundles	36.00 to 37.00
Machine shop turn.	25.00 to 26.00
Shoveling turnings	30.00 to 31.00
Cast iron borings	30.00 to 31.00
Low phos. plate	48.50 to 49.50

Buffalo

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 busheling	40.00 to 41.00
No. 1 bundles	40.00 to 41.00
No. 2 bundles	32.00 to 33.00
Machine shop turn.	27.00 to 28.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. plate	45.00 to 46.00
Scrap rails, random lgth.	47.00 to 48.00
Rails 2 ft and under	52.00 to 53.00
RR. steel wheels	48.00 to 49.00
RR. spring steel	48.00 to 49.00
RR. couplers and knuckles	48.00 to 49.00
No. 1 machinery cast.	43.00 to 44.00
No. 1 cupola cast.	40.00 to 41.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$38.50 to $39.50
No. 2 hvy. melting	31.00 to 32.00
No. 1 bundles, openhearth	38.50 to 39.50
No. 2 bundles	27.00 to 28.00
New busheling	38.50 to 39.50
Drop forge flashings	38.00 to 39.00
Machine shop turn.	19.50 to 20.50
Mixed bor. and turn.	22.50 to 23.50
Shoveling turnings	22.50 to 23.50
Cast iron borings	22.50 to 23.50
Low phos. punch'gs, plate	38.50 to 39.50
No. 1 cupola cast.	40.00 to 41.00
Heavy breakable cast.	34.00 to 35.00
Stove plate	35.00 to 36.00
Automotive cast.	43.00 to 44.00

St. Louis

No. 1 hvy. melting	$38.50 to $39.50
No. 2 hvy. melting	36.00 to 37.00
No. 1 bundles	40.00 to 41.00
No. 2 bundles	31.50 to 32.50
Machine shop turn.	27.00 to 28.00
Cast iron borings	28.00 to 29.00
Shoveling turnings	28.00 to 29.00
No. 1 RR. hvy. melting	46.00 to 47.00
Rails, random lengths	52.00 to 53.00
Rails, 18 in. and under	59.50 to 60.00
Locomotive tires uncut	59.00 to 60.00
Angles and splice bars	50.00 to 51.00
Std. steel car axles	49.00 to 50.00
RR. specialties	50.00 to 51.00
Cupola cast.	46.00 to 47.00
Heavy breakable cast.	35.00 to 36.00
Cast iron brake shoes	37.00 to 38.00
Stove plate	38.00 to 39.00
Cast iron car wheels	47.00 to 48.00
Malleable	48.00 to 49.00
Unstripped motor blocks	37.00 to 38.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$37.00 to $37.50
No. 2 hvy. melting	30.00 to 30.50
No. 1 bundles	37.00 to 37.50
No. 2 bundles	28.00 to 28.50
No. 1 busheling	37.00 to 37.50
Elec. furnace, 3 ft & under	38.50 to 39.00
Machine shop turn.	20.00 to 20.50
Mixed bor. and short turn.	22.00 to 23.00
Shoveling turnings	23.00 to 24.00
Clean cast chem. borings	22.00 to 23.00
No. 1 machinery cast.	32.00 to 33.00
Mixed cupola cast.	30.00 to 31.00
Heavy breakable cast.	33.00 to 34.00
Stove plate	29.00 to 30.00
Unstripped motor blocks	18.00 to 19.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$41.50 to $42.50
No. 2 hvy. melting	36.00 to 37.00
No. 2 bundles	32.00 to 33.00
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	21.00 to 22.00
Shoveling turnings	22.00 to 23.00
Clean cast chem. borings	24.00 to 25.00
No. 1 machinery cast.	39.00 to 40.00
Mixed yard cast.	38.00 to 39.00
Charging box cast.	39.00 to 40.00
Heavy breakable cast.	39.00 to 40.00
Unstripped motor blocks	25.00 to 26.00

Birmingham

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy melting	35.00 to 36.00
No. 1 bundles	38.00 to 39.00
No. 2 bundles	28.00 to 29.00
No. 1 busheling	38.00 to 39.00
Machine shop turn.	27.00 to 28.00
Shoveling turnings	28.00 to 29.00
Cast iron borings	17.00 to 18.00
Electric furnace bundles	43.00 to 44.00
Bar crops and plate	47.00 to 48.00
Structural and plate, 2 ft	46.00 to 47.00
No. 1 RR. hvy. melting	43.00 to 44.00
Scrap rails, random lgth.	53.00 to 54.00
Rails, 18 in. and under	58.50 to 59.50
Angles & splice bars	55.00 to 56.00
Rerolling rails	58.00 to 59.00
No. 1 cupola cast.	47.50 to 48.50
Stove plate	44.50 to 45.50
Charging box cast.	30.00 to 31.00
Cast iron car wheels	38.00 to 39.00
Unstripped motor blocks	36.00 to 37.00
Mashed tin cans	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$42.00 to $43.00
No. 2 hvy. melting	35.50 to 36.50
No. 1 bundles	42.00 to 43.00
No. 2 bundles	33.00 to 34.00
Machine shop turn.	28.50 to 29.50
Mixed bor. and turn.	24.00 to 25.00
Shoveling turnings	31.50 to 32.50
Cast iron borings	25.00 to 26.00
Low phos. 18 in. & under	50.00 to 51.00
Rails, random lengths	53.00 to 54.00
Rails, 18 in. and under	60.00 to 61.00
No. 1 cupola cast.	46.00 to 47.00
Hvy. breakable cast.	41.00 to 42.00
Drop broken cast.	50.00 to 51.00

San Francisco

No. 1 hvy. melting	$39.00
No. 2 hvy. melting	37.00
No. 1 bundles	39.00
No. 2 bundles	33.00
No. 3 bundles	29.00
Machine shop turn.	18.00
Cast iron borings	18.00
No. 1 RR. hvy. melting	39.00
No. 1 cupola cast.	45.00

Los Angeles

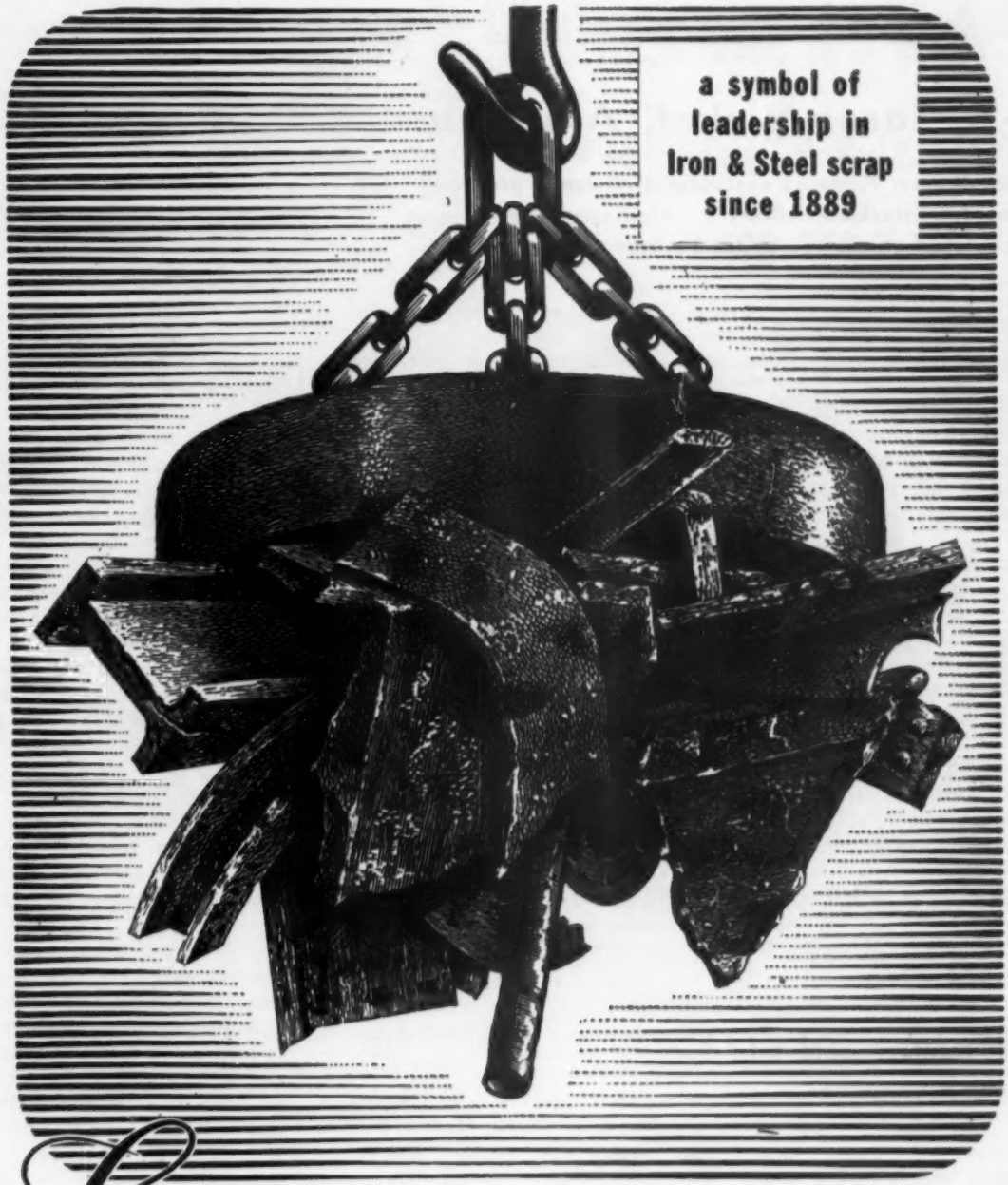
No. 1 hvy. melting	$39.00
No. 2 hvy. melting	37.00
No. 1 bundles	39.00
No. 2 bundles	33.00
No. 3 bundles	29.00
Machine shop turn.	18.00
Shoveling turnings	21.00
Cast iron borings	18.00
Elec. furn. 1 ft and under	39.00
No. 1 RR. hvy. melting	39.00
No. 1 cupola cast.	45.00

Seattle

No. 1 hvy. melting	$42.00
No. 2 hvy. melting	38.00
No. 2 bundles	34.00
No. 3 bundles	30.00
No. 1 cupola cast.	40.00
Mixed yard cast.	40.00

Hamilton, Ont.

No. 1 hvy. melting	$38.50
No. 2 hvy. melting	35.50
No. 1 bundles	38.50
No. 2 bundles	32.50
Mixed steel scrap	32.50
Bushelings	32.50
Bush., new fact. prep'd	36.50
Bush., new fact. unprep'd	32.50
Machine shop turn.	16.00
Short steel turn.	25.50
Mixed bor. and turn.	$16.00 to 17.00
Rails, rerolling	47.50
Cast scrap	43.00 to 45.00



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U.S. Eases Nickel, Aluminum

ODM director Flemming announces diversion of premium nickel from stockpile delivery . . . Aluminum to be set aside for defense, atomic energy cut 2 million lb.

◆ TWO GOVERNMENT diversion actions will give some slight respite to hard-pressed consumers of nickel and aluminum.

The government will divert 2,200,000 lb of premium price ferronickel and nickel ingot formerly destined for the stockpile in November and December to industry.

Aluminum set-asides for defense and atomic energy uses in first quarter of 1956 have been cut two million lb from current levels to 145 million lb.

The nickel diversion was ordered by Mobilization Director Arthur Flemming after consultation with Defense Mobilization Board. Mr. Flemming says this diversion will "slightly more than offset" an expected increase in defense orders. It is in addition to the six million lb already authorized for November and December, and brings to 23,950,000 lb the total amount of nickel diverted to industry this year.

Total amount of nickel available to non-defense users will now be somewhat greater than has been the case to date. ODM says the nickel will be offered by the producers at the same price the government would have paid. Premium-price metal is the only additional nickel being made available to industry at this time.

No nickel is to be released from the national stockpile.

Lower aluminum set-asides are made possible by changing military requirements, Business & Defense Services Administration explains. The agency's aluminum experts point out that first quarter 1956 set-asides represent 16 pct of the anticipated supply of domestic and primary aluminum. In the current quarter, such set-asides total 17 pct of available metal.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Oct. 26	Oct. 27	Oct. 28	Oct. 29	Oct. 31	Nov. 1
Copper, electro, Conn.	43.00	43.00	43.00	....	43.00	43.00
Copper, Lake, delivered	43.00	43.00	43.00	....	43.00	43.00
Tin, Straits, New York	96.25	96.25	96.25	....	96.625	96.625*
Zinc, East St. Louis	13.00	13.00	13.00	13.00	13.00	13.00
Lead, St. Louis	15.30	15.30	15.30	15.30	15.30	15.30

Note: Quotations are going prices **Tentative*

Monthly Average Metal Prices

(Cents per lb except as noted)

Average prices of the major nonferrous metals in October based on quotations appearing in THE IRON AGE, were as follows:

Electrolytic copper		Straits tin, New York	96.213
Del'd Conn. Valley	43.00	Zinc, E. St. Louis	13.043
Lake copper, delivered	43.00	Lead, St. Louis	15.30

Note: Quotations are going prices

TITANIUM . . . Du Pont last week posted further price cuts for titanium metal sponge and set higher quality specifications for high-purity metal. Price of Grade A-1 sponge has been cut from $3.95 to $3.75 per lb, Grade A-2 from $3.50 to $3.25, and Grade A-2 fines from $3.00 to $2.75.

Improvements in quality of Grade A-1 sponge include lowering of hardness specifications to a maximum of 125 Bhn.

ALUMINUM FOIL . . . Consumption of aluminum foil in 1954 surged to 150 million lb, Bureau of Census reports. (Figures do not include cap liners or packaging closures). Mill shipments of foil, according to the Aluminum Assn., were over 153 million lb, a major rise from 1953's 112 million lb and the less than 78 million lb shipped in 1952.

Major uses last year, according to Census, were locker plant, freezer, restaurant and household packaging foil, 26 million lb; containers for food and bakery goods, 19 million lb; and tobacco, 16 million lb.

MAGNESIUM . . . The Magnesium Assn. reported last week that August castings shipments achieved the expected recovery from the usual July low. Total August shipments of magnesium castings were 1088 tons, up 13 pct from the July total of 960 tons.

Magnesium sand castings with an increase of 21 pct and die castings with a rise of 46 pct were well over July shipments. Permanent mold castings, however, dropped 21 pct in August. Comparative totals were:

Type	August	July
Sand	596 tons	491 tons
Die	267 tons	183 tons
Perm. Mold	225 tons	286 tons

Comparisons of August 1955 figures with the same month of 1954 show drops of three pct for sand castings, 15 pct for permanent mold castings and an increase of 33 pct for die castings. Totals for the year continue slightly ahead of 1954 year-to-date totals.

We'll be happy to advise you on costs of any shape and size of spring you want produced. Springs, wire forms and small parts are our *only* business and we have the experienced "know how" to help you save time and money. You can bet your bottom dollar that U. S. springs, wire forms and small parts will operate according to specifications. Call U. S. today!

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"SHEAR-SEAL" 4-WAY VALVE

FOR 250 P.S.I. AIR

For years Barksdale Valves have provided a standard line of "Shear-Seal" valves for 2000 and 4000 p.s.i. air service, which no other standard valve can handle.

Then it is news when this highly efficient valve principle becomes available for the shop air service range at a very competitive price. The performance and internal construction of this popular model resembles closely that of its older, more powerful brothers. Automatic tooling for mass production has resulted in considerable savings in unit cost which are passed along to the user in the form of a high quality valve at this low list price. A twelve page booklet explaining the "Shear-Seal" principle in detail is yours for the asking. A number of convenience features have been incorporated in the design to take the strain out of plumbing or mounting. For example, any port can be used as the pressure inlet. A sturdy mounting bracket that can be turned where you want it comes as a "no charge" accessory. For the complete story, write for literature 2801.

*$18.50 is the list price for the ¼ inch port size and $19.50 for the ⅜ inch, less the usual quantity and trade discounts.

BARKSDALE VALVES

5125 Alcoa Ave., Los Angeles 58, Calif.

☐ Please send the "Shear-Seal" booklet

☐ Please send 2801 literature

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

Nonferrous Prices *(Effective Nov. 1, 1955)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136-.249	.250-3.
1100, 3003....	40.8	38.7	37.5	36.5
5052.....	48.5	43.4	41.7	39.9
6061-0.....	45.4	41.2	39.4	39.3

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6- 8.....	41.6-43.3	56.6-60.2
12-14.....	42.3-43.7	57.5-61.8
24-26.....	45.3-45.7	67.7-72.1
36-38.....	53.6-54.2	90.5-94.3

Screw Machine Stock—2011-T-3

Size*	¾	⅝-¾	½-1	1¼-1½
Price	54.5	53.4	52.1	50.1

Roofing Sheet, Corrugated

(Per sheet, 26" wide, base, 16,000 lb)

Length* →	72	96	120	144
.019 gage....	$1.295	$1.727	$2.160	$2.590
.024 gage....	1.615	2.162	2.692	3.232

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FS1-O ¼ in., 61¢; 3/16 in., 62¢; ½ in., 61¢; 0.064 in., 78¢; 0.032 in., 99¢. Specification grade higher. Base, 30,000 lb.

Extruded Round Rod: FS, diam ¼ to 0.311 in., 82.5¢; ⅜ to ⅝ in., 65¢; 1¼ to 1.749 in., 60.5¢; 2½ to 5 in., 57¢. Other alloys higher. Base up to ⅝ diam, 10,000 lb; ⅝ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: FS. In weight per ft for perimeters less than size indicated: 0.10 to 0.11 lb, 3.5 in., 70.7¢; 0.22 to 0.25 lb, 5.9 in., 66.9¢; 0.50 to 0.59 lb, 8.6 in., 63¢; 1.8 to 2.50 lb, 19.5 in., 60.8¢; 4 to 6 lb, 28 in., 57.7¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: FS, 0.049 to 0.057 in. wall thickness: OD ⅛ to 5/16 in., $1.625; 5/16 to ⅝ in., $1.475; ½ to ⅝ in., $1.105; 1 to 2 in., 92.5¢; 0.165 to 0.219 in. wall: OD, ⅝ to ⅞ in., 75.5¢; 1 to 2 in., 71.5¢; 3 to 4 in., 70.5¢. Other alloys higher. Base OD: Up to 1½ in., 10,000 lb; 1½ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	56.79	....	58.56
Copper, h-r ...	58.76	55.11	....
Copper, drawn.	....	56.36	....
Low brass ...	53.15	53.09	....
Yellow brass .	49.27	49.21	....
Red brass	54.54	54.48	....
Naval brass ..	52.83	47.14	48.40
Leaded brass..	....	....	45.74
Com. bronze ..	56.48	56.42	....
Mang. bronze..	56.57	50.67	52.23
Phos. bronze ..	77.14	77.64	....
Munts metal ..	50.94	46.75	48.00
Ni silver, 10 pct	63.05	66.13	63.50

Beryllium copper, CR, 1.9% Be, Base 2000 lb, f.o.b.

Strip	$1.84
Rod, bar, wire	1.81

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	102	83	99
Strip, CR	102	92	125
Rod, Bar, HR..	87	74	93
Angles, HR ...	87	74	93
Plate, HR	97	87	95
Seamless Tube.	122	110	153
Shot, Blocks		71	...

Titanium

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $14.00-$14.50; alloy $16.50; Plate, HR, commercially pure, $11.50-$12.00; alloy, $12.50-$12.75; Wire, rolled and/or drawn, commercially pure, $10.50-$11.00; alloy, $12.50; Bar, HR or forged, commercially pure, $8.50-$8.75; alloy, $8.50-$9.00.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	24.40
Aluminum pig	22.50
Antimony, American, Laredo, Tex..	33.50
Beryllium copper, per lb conta'd Be.	$43.00
Beryllium aluminum 5% Be, Dollars per lb contained Be	$72.75
Bismuth, ton lots	$2.25
Cadmium, del'd	$1.70
Cobalt, 97-99% (per lb)	$2.60 to $2.67
Copper, electro, Conn. Valley	43.00
Copper, Lake, delivered	43.00
Gold, U. S. Treas., per troy oz.	$35.00
Indium, 99.9%, dollars per troy oz..	$2.25
Iridium, dollars per troy oz...	$100 to $120
Lead, St. Louis	15.30
Lead, New York	15.50
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig	32.50
ingot	33.25
Magnesium, sticks, 100 to 500 lb....	53.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$280 to $285
Nickel electro	64.50
Nickel oxide sinter at Copper Cliff, Ont., contained nickel	60.75
Palladium, dollars per troy oz...	$22 to $24
Platinum, dollars per troy oz...	$97 to $99
Silver, New York, cents per troy oz.	91.625
Tin, New York	96.625*
Titanium, sponge, grade A-1	$3.75
Zinc, East St. Louis	13.00
Zinc, New York	13.50
Zirconium, sponge	$7.50 to $10.00

* Tentative

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	41.00
No. 120	40.50
No. 123	40.00
80-10-10 ingot	
No. 305	44.75
No. 315	43.00
88-10-2 ingot	
No. 210	56.25
No. 215	52.75
No. 245	47.25
Yellow ingot	
No. 405	32.75
Manganese bronze	
No. 421	36.25

Aluminum Ingot

(Cents per lb del'd 20,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper max.	32.25-32.25
0.60 copper max.	32.00-32.00
Piston alloys (No. 122 type) ..	32.50-32.50
No. 12 alum. (No. 2 grade) ...	30.50-31.50
108 alloy	30.50-31.50
195 alloy	32.50-32.50
13 alloy (0.60 copper max.)...	32.00-32.00
AXS-679	30.50-31.50

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½%	31.25-32.25
Grade 2—92-95%	30.25-31.25
Grade 3—90-92%	29.50-30.50
Grade 4—85-90%	29.00-30.00

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	39	38¼
Yellow brass	28⅝	26⅝
Red brass	34¼	33½
Comm. bronze	35⅝	35
Mang. bronze	26⅞	25⅞
Yellow brass rod ends	28⅝	

Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	39
No. 2 copper wire	37½
Light copper	35¼
*Refinery brass	35½

* Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	39
No. 2 copper wire	37½
Light copper	35¼
No. 1 composition	22 —22½
No. 1 comp. turnings	21½—22
Rolled brass	24¾—25
Brass pipe	24 —24½
Radiators	24½—25
Aluminum	
Mixed old cast.	20 —20½
Mixed new clips	22 —22½
Mixed turnings, dry	20½—21½

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire.	25½—36
No. 2 heavy copper and wire.	34 —34½
Light copper	31½—32
New type shell cuttings ...	31½—32
Auto radiators (unsweated)..	23 —23½
No. 1 composition	28 —29
No. 1 composition turnings ..	27 —28
Unlined red car boxes	23 —23½
Cocks and faucets	23 —23½
Mixed heavy yellow brass ...	19½—20
Old rolled brass	21 —21½
Brass pipe	23 —23½
New soft brass clippings	25 —25½
No. 1 brass rod turnings	23 —23½

Aluminum

Alum. pistons and struts	16½—17
Aluminum crankcases	16½—17
1100 (2S) aluminum clippings	19⅛
Old sheet and utensils	16½—17
Borings and turnings	11
Misc. cast aluminum	16½—17
2024 (24s) clippings	18 —18½

Zinc

New zinc clippings	8 — 8⅛
Old zinc	5½— 6
Zinc routings	3½— 4
Old die cast scrap	3¼— 3½

Nickel and Monel

Pure nickel clippings	90 —100
Clean nickel turnings	75 —80
Nickel anodes	90 —100
Nickel rod ends	90 —100
New Monel clippings	60
Clean Monel turnings	44
Old sheet Monel	45
Nickel silver clippings, mixed.	23
Nickel silver turnings, mixed.	19

Lead

Soft scrap lead	12 —12¼
Battery plates (dry)	6½— 6⅝
Batteries, acid free	4¼

Magnesium

Segregated solids	18½—19
Castings	17½—18

Miscellaneous

Block tin	80
No. 1 pewter	60 —62
Auto babbitt	45
Mixed common babbitt	14½
Solder joints	18 —18½
Siphon tops	42
Small foundry type	15 —15½
Monotype	15
Lino. and stereotype	13½—13⅝
Electrotype	12½—12⅝
Hand picked type shells	11¼
Lino. and stereo. dross	5 — 5¼
Electro dross	3¾— 4¼

IRON AGE

STEEL PRICES

(Effective Nov. 1, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$96.00 *B3*		4.65 *B3*	6.80 *B3*	4.65 *B3*						
	Buffalo, N. Y.	$68.50 *B3*	$84.50 *R3, B3*	$96.00 *R3, B3*	5.45 *B3*	4.65 *B3*	6.80 *B3*	4.65 *B3*	4.325 *R3,B3*	6.25 *B3* 6.25 *R7,S10*	6.425 *B3*	9.10 *B3*		
	Claymont, Del.													13.45 *C11*
	Harrison, N. J.													
	Conshohocken, Pa.								4.375 *A2*	6.30 *A2*	6.425 *A2*			
	New Bedford, Mass.									6.70 *R6*				
	Johnstown, Pa.	$68.50 *B3*	$84.50 *B3*	$96.00 *B3*		4.65 *B3*	6.80 *B3*							
	Boston, Mass.									6.80 *T8*				13.80 *T8*
	New Haven, Conn.									6.70 *D1* 7.00 *A5*				
	Phoenixville, Pa.					5.15 *P2*		5.15 *P2*						
	Sparrows Pt., Md.								4.325 *B3*	6.25 *B3*	6.425 *B3*	9.10 *B3*		
	Bridgeport, Wallingford, Conn.	$73.50 *N8*	$89.50 *N8*						4.625 *N8*	6.70 *W1*			7.50 *N8*	
	Pawtucket, R. I. Worcester, Mass.									90 *N7* ..0 *A5*				*A5* 13.80 *N7*
MIDDLE WEST	Alton, Ill.								4.50 *L1*					
	Ashland, Ky.								4.325 *A7*					
	Canton-Massillon, Dover, Ohio		$86.50 *R3*	$96.00 *R3*										13.45 *G4*
	Chicago, Ill.	$68.50 *U1*	$84.50 *R3, U1,W8*	$96.00 *R3, U1,W8*	5.45 *U1*	4.60 *U1, W8*	6.75 *U1, Y1*	4.60 *U1*	4.325 *A1, N4,W8*	6.35 *A1,T8*			7.20 *W8*	13.45 *T8*
	Cleveland, Ohio									6.25 *A5,J3*		9.30 *A5*		13.45 *A5*
	Detroit, Mich.			$96.00 *R5*					4.425 *G3,M2*	6.35 *D1,D2, G3,M2,P11*	6.525 *G3*	9.20 *D2, G3*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$68.50 *U1*	$84.50 *U1*	$96.00 *U1, Y1*	5.45 *I3*	4.60 *U1, I3*	6.75 *U1, I3*		4.325 *I3, U1,Y1*	6.35 *I3* 6.25 *Y1*	6.425 *I3, U1,Y1*	9.30 *Y1*	7.20 *Y1, U1*	
	Sterling, Ill.								4.425 *N4*					
	Indianapolis, Ind.									6.40 *C5*				
	Newport, Ky.												7.20 *N5*	
	Middletown, Ohio									6.45 *A7*				
	Niles, Warren, Ohio Sharon, Pa.	$68.50 *C10*	$84.50 *C10*	$96.00 *C10*					4.325 *S1, R3*	6.25 *S1, R3,T4*	6.425 *S1, R3*	9.10 *S1, R3*	7.20 *S1*	13.45 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$68.50 *U1, J3*	$84.50 *J3, U1,C11*	$96.00 *U1, C11*	5.45 *U1*	4.60 *U1, J3*	6.75 *U1, J3*	4.60 *U1*	4.325 *P6*	6.25 *S7,B4*			7.20 *S9*	13.45 *S9*
	Portsmouth, Ohio								4.325 *P7*	6.25 *P7*				
	Weirton, Wheeling, Follansbee, W. Va.					4.60 *W3*			4.325 *W3*	6.25 *F3,W3*	6.425 *W3*	9.10 *W3*		
	Youngstown, Ohio		$84.50 *C10*	$96.00 *Y1, C10*		4.60 *Y1*	6.75 *Y1*		4.325 *U1, Y1*	6.25 *Y1,C5*	6.425 *U1, Y1*	9.30 *Y1*	7.20 *U1, Y1*	13.45 *C5*
WEST	Fontana, Cal.	$76.00 *K1*	$92.00 *K1*	$115.00 *K1*		5.25 *K1*	7.40 *K1*	5.40 *K1*	5.075 *K1*	8.00 *K1*	7.525 *K1*		8.05 *K1*	
	Geneva, Utah		$84.50 *C7*			4.60 *C7*	6.75 *C7*							
	Kansas City, Mo.					4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	
	Los Angeles, Torrance, Cal.		$94.00 *B2*	$116.00 *B2*		5.30 *C7, B2*	7.45 *B2*		5.075 *C7, B2*	8.30 *C1*			8.40 *B2*	
	Minnequa, Colo.					4.90 *C6*			5.425 *C6*					
	Portland, Ore.					5.35 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$94.00 *B2*			5.25 *B2, P9*	7.40 *B2*		5.075 *B2, C7*					
	Seattle, Wash.		$98.00 *B2*			5.35 *B2*	7.50 *B2*		5.325 *B2*					
SOUTH	Atlanta, Ga.								4.525 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$68.50 *T2*	$84.50 *T2*			4.60 *C16, R3,T2*	6.75 *T2*		4.325 *R3, C16,T2*		6.425 *T2*			
	Houston, Lone Star, Tex.	$74.50 *L3*	$89.50 *S2*	$101.00 *S2*		4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	

IRON AGE

STEEL PRICES

(Effective Nov. 1, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized 10 ga.	Enameling 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Hollowware Enameling 29 ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.325 *B3*	5.325 *B3*				6.375 *B3*	7.875 *B3*			*W6*	† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.													
	Conshohocken, Pa.	4.375 *A2*	5.375 *A2*				6.425 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										5.025 *B3*			
	Fairless, Pa.	4.375 *U1*	5.375 *U1*				6.425 *U1*	7.925 *U1*				$9.30 *U1*	$8.00 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.325 *B3*	5.325 *B3*	5.85 *B3*			6.375 *B3*	7.875 *B3*	8.60 *B3*		5.125 *B3*	$9.30 *B3*	$8.00 *B3*	
	Worcester, Mass.										5.325 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										5.20 *L1*			
	Ashland, Ky.	4.325 *A7*		5.85 *A7*	5.90 *A7*									
	Canton-Massillon, Dover, Ohio			5.85 *R1, R3*										
	Chicago, Joliet, Ill.	4.325 *A1, W8*					6.375 *U1*				5.025 *A5, N4, R3*			
	Sterling, Ill.										5.125 *N4*			
	Cleveland, Ohio	4.325 *J3, R3*	5.325 *J3, R3*		5.90 *R3*		6.375 *J3, R3*	7.875 *J3, R3*			5.025 *A5*			
	Detroit, Mich.	4.425 *G3, M2*	5.425 *G3* 5.325 *M2*				6.475 *G3*	7.975 *G3*						
	Newport, Ky. —4	4.325 *N5*	5.325 *N5*	5.85 *N5*										
	Gary, Ind. Harbor, Indiana	4.325 *I3, U1,Y1*	5.325 *I3, U1,Y1*	5.85 *U1, I3*	5.90 *U1, I3*	6.25 *U1*	6.375 *Y1, U1,I3*	7.875 *U1, Y1*			5.025 *Y1*	$9.20 *I3, U1,Y1*	$7.90 *I3, U1,Y1*	6.65 *U1, Y1*
	Granite City, Ill.	4.525 *G2*	5.525 *G2*	6.05 *G2*	6.10 *G2*								$8.00 *G2*	6.75 *G2*
	Kokomo, Ind.	4.425 *C9*		5.95 *C9*						5.475 *C9*	5.125 *C9*			
	Mansfield, Ohio	4.325 *E2*	5.325 *E2*			6.25 *E2*				*E2*				
	Middletown, Ohio		5.325 *A7*	5.85 *A7*	5.90 *A7*	6.25 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.325 *S1, R3,N3*	5.325 *R3, N3*	5.85 *R3* 6.85 *N3*	5.90 *N3*	6.25 *N3*	6.375 *S1, R3*	7.875 *R3*				$9.20 *R3*	$7.90 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.325 *J3, U1,P6*	5.325 *J3, U1,P6*	5.85 *U1*	5.90 *U1, A7*		6.375 *J3, U1*	7.875 *U1*	8.60 *U1*		5.025 *A5, P6*	$9.20 *J3, U1*	$7.90 *J3, U1*	6.65 *U1*
	Portsmouth, Ohio	4.325 *P7*	5.325 *P7*								5.025 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.325 *W3, W5*	5.325 *W3, W5,F3*	5.85 *W3, W5*		6.25 *W3, W5*	6.375 *W3*	7.875 *W3*				$9.20 *W3, W5*	$7.90 *W3, W5*	6.65 *F3, W5*
	Youngstown, Ohio	4.325 *U1, Y1*	5.325 *Y1*		5.90 *Y1*		6.375 *U1, Y1*	7.875 *Y1*			5.025 *Y1*			
WEST	Fontana, Cal.	5.075 *K1*	6.425 *K1*				7.125 *K1*	8.975 *K1*						
	Geneva, Utah	4.425 *C7*												
	Kansas City, Mo.										5.275 *S2*			
	Los Angeles, Torrance, Cal.										5.425 *B2*			
	Minnequa, Colo.										5.275 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.025 *C7*	6.275 *C7*	6.60 *C7*							5.675 *C7*	$9.95 *C7*	$8.65 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.325 *R3, T2*	5.325 *T2*	5.85 *R3, T2*			6.375 *T2*			5.625 *R3*	5.025 *R3, T2*	$9.30 *T2*	$8.00 *T2*	
	Houston, Tex.										5.275 *S2*			

IRON AGE

STEEL PRICES

(Effective Nov. 1, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				5.575 *B3*	7.425 *B3*	6.80 *B3*					
	Buffalo, N. Y.	4.65 *B3,R3*	4.65 *B3,R3*	5.95 *B5*	5.575 *B3,R3*	7.425 *B3,B5*	6.80 *B3*	4.50 *B3,R3*				6.25 *W6*
	Claymont, Del.							4.80 *C4*		6.30 *C4*	6.725 *C4*	
	Coatesville, Pa.							4.80 *L4*		6.30 *L4*	6.725 *L4*	
	Conshohocken, Pa.							4.50 *A2*	5.575 *A2*		6.725 *A2*	
	Harrisburg, Pa.							5.10 *C3*	5.575 *C3*			
	Hartford, Conn.			6.40 *R3*		7.725 *R3*						
	Johnstown, Pa.	4.65 *B3*	4.65 *B3*		5.575 *B3*		6.80 *B3*	4.50 *B3*		6.30 *B3*	6.725 *B3*	6.25 *B3*
	Fairless, Pa.	4.80 *U1*	4.80 *U1*		5.725 *U1*							
	Newark, N. J.			6.35 *W10*		7.60 *W10*						
	Camden, N. J.			6.35 *P10*								
	Bridgeport, Putnam, Conn.	4.80 *N8*		6.45 *W10*	5.725 *N8*			4.750 *N8*				
	Sparrows Pt., Md.		4.65 *B3*					4.50 *B3*		6.30 *B3*	6.725 *B3*	6.35 *B3*
	Palmer, Worcester, Readville, Mass.			6.35 *W11* 6.45 *B5,C14*		7.725 *A5,B5*		4.50 *R3*				6.55 *A5, W6*
	Spring City, Pa.			6.35 *K4*		7.60 *K4*						
MIDDLE WEST	Alton, Ill.	4.85 *L1*										6.425 *L1*
	Ashland,Newport,Ky.							4.50 *A7,N5*		6.30 *N5*		
	Canton-Massillon, Mansfield, Ohio	4.75 *R3*		5.90 *R2,R3*	5.575 *R3,T5*	7.425 *R2,R3, T5*		4.50 *E2*				
	Chicago, Joliet, Ill.	4.65 *U1, N4,W8,R3, P13*	4.65 *N4,R3, P13*	5.90 *A5,W10, W8,B5,L2*	5.575 *U1,R3, W8*	7.425 *A5,W8, W10,L2,B5*		4.50 *U1,W8, I3,A1,R3*	5.575 *U1*	6.30 *U1*	6.725 *U1*	6.25 *A5,R3, N4,W7*
	Cleveland, Ohio	4.65 *R3*	4.65 *R3*	5.90 *A5,C13*		7.425 *A5,C13*	6.80 *R3*	4.60 *J3,R3*	5.575 *J3*		6.725 *R3,J3*	6.25 *A5, C13*
	Detroit, Mich.	4.75 *G3*	4.75 *G3*	5.90 *R5* 6.10 *B5,P8* 6.15 *P3*	5.575 *R5* 5.675 *G3*	7.425 *R5* 7.625 *B5,P3 P8*	6.90 *G3*	4.60 *G3*			6.825 *G3*	
	Duluth, Minn.											6.25 *A5*
	Gary, Ind. Harbor, Crawfordsville	4.65 *I3, U1, Y1*	4.65 *I3, U1, Y1*	5.90 *M5,R3*	5.575 *I3, U1, Y1*	7.425 *M5, R3*	6.80 *U1,I3, Y1*	4.50 *I3, U1,Y1*	5.575 *I3*	6.30 *U1,Y1*	6.725 *U1, I3,Y1*	6.35 *M4*
	Granite City, Ill.							4.70 *G2*				
	Kokomo, Ind.											6.35 *C9*
	Sterling, Ill.	4.75 *N4*	4.75 *N4*									6.35 *N4*
	Niles, Warren, Ohio Sharon, Pa.	4.65 *R3,C10*		5.90 *C10*	5.575 *C10*	7.425 *C10*	6.80 *R3*	4.50 *S1,R3*		6.30 *S1*	6.725 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.65 *J3, U1, C11*	4.65 *J3, U1*	5.90 *A5,C8, C11,J3, W10,B4,R3*	5.575 *U1,C11*	7.425 *A5,C11, W10,C8,R3*	6.80 *J3, U1*	4.50 *J3, U1*	5.575 *U1*	6.30 *U1*	6.725 *J3, U1*	6.25 *A5,J3, P6*
	Portsmouth, Ohio											6.25 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.65 *W3*						4.50 *W3,W5*				
	Youngstown, Ohio	4.65 *U1,Y1, C10,R3*	4.65 *U1,Y1, R3*	5.90 *Y1, U1*	5.575 *U1,Y1, C10*	7.425 *Y1,C10* 7.665 *F2*	6.80 *U1,Y1*	4.50 *U1,Y1, R3*		6.30 *Y1*	6.725 *Y1*	6.25 *Y1*
WEST	Emeryville, Cal.	5.40 *J5*	5.40 *J5*									
	Fontana, Cal.	5.35 *K1*	5.35 *K1*		6.625 *K1*		7.50 *K1*	5.15 *K1*		6.95 *K1*	7.375 *K1*	
	Geneva, Utah							4.50 *C7*			6.725 *C7*	
	Kansas City, Mo.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*					6.50 *S2*
	Los Angeles, Torrance, Cal.	5.35 *B2,C7*	5.35 *B2,C7*	7.35 *R3*	6.625 *B2*		7.50 *B2*				7.625 *B2*	7.20 *B2*
	Minnequa, Colo.	5.10 *C6*	5.10 *C6*					5.35 *C6*				6.50 *C6*
	Portland, Ore.	5.40 *O2*	5.40 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.35 *C7* 5.40 *B2,P9*	5.35 *C7* 5.40 *B2,P9*				7.55 *B2*					7.20 *C7*
	Seattle, Wash.	5.40 *B2,P12, N6*	5.40 *B2,P12*				7.55 *B2*	5.40 *B2*		7.20 *B2*	7.625 *B2*	
SOUTH	Atlanta, Ga.	4.85 *A8*	4.85 *A8*									6.45 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.65 *T2,C16, R3*	4.65 *T2,C16, R3*				6.90 *T2*	4.50 *T2,R3*			6.725 *T2*	6.25 *R3, T2*
	Houston, Ft. Worth, Lone Star, Tex.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*	4.85 *L3* 4.60 *S2*		5.40 *S2*	6.825 *S2*	6.50 *S2*

Steel Prices *(Effective Nov. 1, 1955)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Disston & Sons, Inc., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmith Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P12 Pacific Steel Rolling Mills, Seattle
P13 Phoenix Mfg. Co., Joliet, Ill.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	⅛ In.		¼ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	15.50	0.25	18.50	4.25	21.00	7.75	23.50	8.50	24.00	9.50	24.50	10.00	26.00	9.75								
Youngstown *R3*	17.50	0.25	20.50	4.25	23.00	7.75	25.50	9.00	26.00	10.00	26.50	10.50	28.00	10.75								
Fontana *K1*	6.00	+0.25	9.00	+0.25	11.50	+1.75	14.00	+1.00	14.50	+0.00	15.00	0.50	16.50	0.25								
Pittsburgh *J3*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+6.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Alton, Ill. *L1*	15.50	0.25	18.50	4.25	21.00	7.75	23.50	8.50	24.00	9.50	24.50	10.00	26.00	9.75								
Sharon *M3*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75								
Fairless *N2*	15.00	0.25	18.50	4.25	21.00	7.75	23.50	8.50	24.00	9.50	24.50	10.00	26.00	9.75								
Pittsburgh *N1*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+6.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Wheeling *W5*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75								
Wheatland *W4*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75								
Youngstown *Y1*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+6.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Indiana Harbor *Y1*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75								
Lorain *N2*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+6.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	20.0	6.25	24.00	10.25	26.00	13.75	26.50	12.50	27.00	13.50	27.50	14.00	28.00	12.75								
Youngstown *R3*	22.0	6.25	26.00	10.25	28.00	13.75	28.50	13.00	29.00	14.00	29.50	14.50	30.00	13.75								
Fairless *N2*	20.0	6.25	24.00	10.25	26.00	13.75	26.50	12.50	27.00	13.50	27.50	14.00	28.00	12.75								
Fontana *K1*	10.50		14.50		16.50		17.00		17.50		18.00		18.50									
Pittsburgh *J3*	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Alton, Ill. *L1*	20.0	6.25	24.00	10.25	26.00	13.75	26.50	12.50	27.00	13.50	27.50	14.00	28.00	12.75								
Sharon *M3*	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75								
Pittsburgh *N1*	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Wheeling *W5*	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75								
Wheatland *W4*	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75								
Youngstown *Y1*	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Indiana Harbor *Y1*	21.0	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75								
Lorain *N2*	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75

Threads only, buttweld and seamless 2½ pt higher discount. Plain ends, buttweld and seamless, 3-in. and under, 4½ pt higher discount. Buttweld jobbers discount, 5 pct.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb, East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ⅛, ¼ and 1-in., 2 pt.; 1¼, 1½ and 2 in., 1½ pt.; 2½ and 3-in., 1 pt. e.g., zinc price range of over 11¢ to 13¢ would lower discounts; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.00¢ per lb.

Steel Prices *(Effective Nov. 1, 1955)*

To identify producers, see Key on preceding page.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *UI*	4.725	5.65	5.825	.....	.....	.....	.....
So. Chicago *R3*	.....	.....	.....	7.50	.....	.....	.....
Ensley *T2*	4.725	5.65	.....	.....	.....	.....	.....
Fairfield *T2*	.....	5.65	.....	7.50	.....	5.625	.....
Gary *UI*	4.725	5.65	.....	.....	.....	5.625	.....
Ind. Harbor *I3*	4.725	.....	5.825	7.50	.....	5.525	.....
Johnstown *B3*	.....	5.65	.....	.....	.....	.....	.....
Joliet *UI*	.....	5.65	5.825	.....	.....	.....	.....
Kansas City *S2*	.....	.....	.....	7.90	.....	.....	.....
Lackawanna *B3*	4.725	5.65	5.825	.....	.....	5.625	.....
Minnequa *C6*	4.725	6.15	5.825	7.50	.....	5.625	12.40
Pittsburgh *O1*	.....	.....	.....	.....	11.90	.....	12.40
Pittsburgh *P5*	.....	.....	.....	.....	.....	.....	12.40
Pittsburgh *J3*	.....	.....	.....	7.90	.....	.....	.....
Seattle *B2*	.....	.....	.....	8.40	.....	5.775	12.90
Stockton *B3*	4.725	.....	5.825	.....	.....	5.625	.....
Struthers *Y1*	.....	.....	.....	7.90	.....	.....	.....
Torrance *C7*	.....	.....	.....	.....	.....	5.775	.....
Williamsport *S5*	.....	5.65	.....	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	7.90	.....	.....	.....

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	8.40	8.60	.....
Armature	9.35	9.60	10.10
Elect.	9.95	10.20	10.70
Motor	10.95	11.20	11.70
Dynamo	11.85	12.10	12.60
Trans. 72	12.80	13.05	13.55
Trans. 65	13.35	Grain Oriented	
Trans. 58	13.85	Trans. 80	17.45
Trans. 52	14.85	Trans. 73	17.95

Producing points: Beech Bottom *(W3)*; Brackenridge *(A3)*; Granite City *(G2)*; Indiana Harbor *(I5)*; Mansfield *(E2)*; Newport, Ky. *(N5)*; Niles, O. *(N3)*; Vandergrift *(U1)*; Warren, O. *(R3)*; Zanesville *(A7)*.

* Coils 75¢ higher.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire Fence 9–15½ ga. Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'd ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	152	162	...	173	175	7.40	7.80
Aliquippa, Pa. *J3*	152	162	...	...	...	7.40	7.80
Atlanta *A8*	154	167	...	175	180	7.50	8.025
Bartonville *K2**	154	168	...	175	181	7.50	8.075
Buffalo *W6*	...	...	...	...	...	7.40	7.80
Chicago, Ill. *N4***	152	166	...	173	179	7.40	8.00
Cleveland *A6*	157	...	...	...	...	7.40	.....
Cleveland *A5*	...	...	...	...	...	7.40	.....
Crawfordsville *M6**	154	167	...	175	175	7.50	8.05
Donora, Pa. *A5*	152	162	...	173	175	7.40	7.80
Duluth *A5*	152	162	...	173	175	7.40	7.80
Fairfield, Ala. *T2*	152	162	...	173	175	7.40	7.80
Galveston *D4*	157	...	...	...	...	...	.....
Houston *S2*	167	170	...	...	180	7.65	8.05
Johnstown, Pa. *B3**	152	166	...	...	175	7.40	7.80
Joliet, Ill. *A5*	152	162	...	173	175	7.40	7.80
Kokomo, Ind. *C9*	154	154	...	175	177	7.50	7.90
Los Angeles *B2**	...	...	...	...	...	8.35	8.925
Kansas City *S2*	167	174	...	178	180	7.65	8.05
Minnequa *C6*	157	167	162	178	180	7.65	8.05
Monessen *P6*	152	162	...	...	...	7.40	7.80
Moline, Ill. *R3*	...	162	162	...	...	...	.....
Pittsburg, Cal. *C7*	171	185	...	...	195	8.35	8.75
Portsmouth *P7*	...	...	...	...	...	7.40	.....
Rankin, Pa. *A5*	152	162	...	...	175	7.40	7.80
So. Chicago *R3*	152	162	157	173	175	7.40	7.80
S. San Francisco *C6*	...	...	...	197	195	8.35	8.75
Sparrows Pt. *B3**	154	...	...	175	181	7.50	8.075
Struthers, O. *Y1*	...	...	...	...	...	7.40	7.90
Worcester *A5*	158	...	...	...	...	7.70	.....
Williamsport, Pa. *S5*	...	...	160	...	...	...	.....

Galvanized products computed with zinc at 5¢ per lb. Exceptions: *zinc at 12.5¢ per lb; **13¢ zinc.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Bristol, Conn., *W12*	.....	.....	10.80	12.95	15.65
Buffalo, N. Y. *R7*	7.00	8.95	10.50	12.65	15.35
Carnegie, Pa. *S9*	.....	8.95	10.50	12.65	15.35
Cleveland *A5*	7.00	8.95	10.50	12.65	15.35
Detroit *D1*	7.10	9.05	10.60	12.75	.....
Detroit *D2*	7.10	9.05	10.60	.....	.....
Harrison, N. J. *C11*	.....	.....	10.80	12.95	15.65
Indianapolis *C5*	7.15	9.10	10.50	12.65	15.35
New Castle, Pa. *B4*	7.00	8.95	10.50	12.65	.....
New Haven, Conn. *D1*	7.45	9.25	10.80	12.95	.....
Pawtucket, R. I. *N7*	7.55	9.25	10.80	12.95	15.65
Pittsburgh *S7*	7.00	8.95	10.50	12.65	15.35
Riverdale, Ill. *A1*	7.10	8.95	10.50	12.65	15.35
Sharon, Pa. *S1*	7.00	8.95	10.50	12.65	15.35
Trenton *R4*	.....	.....	.....	.....	.....
Wallingford *W1*	7.45	9.25	10.80	12.95	15.65
Warren, Ohio *T4*	7.00	8.95	10.50	12.65	15.35
Weirton, W. Va. *W3*	7.10	8.95	10.50	.....	.....
Worcester, Mass. *A5*	7.85	9.25	10.80	12.95	15.65
Youngstown *C5*	7.00	8.95	10.50	12.65	15.35

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	30.87	36.51	29.93	.....
	2½	12	41.57	49.16	40.31	.....
	3	12	47.99	56.76	46.55	.....
	3½	11	56.03	66.27	54.34	.....
	4	10	74.41	88.00	72.17	.....
National Tube	2	13	30.87	36.51	29.93	.....
	2½	12	42.57	49.16	40.31	.....
	3	12	47.99	56.76	46.55	.....
	3½	11	56.03	66.27	54.34	.....
	4	10	74.41	88.00	72.17	.....
Pittsburgh Steel	2	13	30.87	36.51	.....	.....
	2½	12	41.57	49.16	.....	.....
	3	12	47.99	56.76	.....	.....
	3½	11	56.03	66.27	.....	.....
	4	10	74.41	88.00	.....	.....

WAREHOUSES

Base price, f.o.b., dollars per 100 lb.

Cities	City Delivery Charge	Sheets: Hot-Rolled	Sheets: Cold-Rolled	Sheets: Galvanized (18 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Baltimore	$.10	7.03	8.32	8.37	7.65	.....	7.21	7.93	7.61	8.62	14.38	13.44–13.96	16.36	16.29–16.49
Birmingham	.15	6.80	7.93	8.85	7.06	.....	6.99	7.28	7.00	9.35	.....	.....	.....	.....
Boston	.10	7.70	8.81	10.27	7.94–7.96	10.30	7.89	8.13	7.83	9.53	13.65–13.80	13.40–13.45	16.65	16.50
Buffalo	.30	6.80	8.05	9.77	7.15	.....	7.15	7.40	7.10	7.90	.....	13.10	.....	16.15
Chicago	.25	6.80	8.09	8.50	7.66	.....	6.99	7.28	7.08	7.75	13.20	12.85	16.05	15.90
Cincinnati	.25	6.92	8.33	8.90	7.30	.....	7.28	7.75	7.32	8.05	13.44	13.09	16.29	16.14
Cleveland	.30	6.80	8.09	8.85	7.16	.....	7.16	7.61	7.14	7.85	.....	12.91	.....	15.96
Denver	.....	8.60	10.00	11.22	8.90	.....	8.60	8.75	8.90	9.82	.....	.....	.....	17.97
Detroit	.25	6.99	8.53	8.78	7.34	8.15	7.27	7.75	7.36	8.04	13.40	13.05	16.25	16.10
Houston	.....	7.85	8.75	10.49	8.15	.....	7.80	8.20	8.25	9.85–9.95	14.35	14.00	17.15	16.80
Kansas City	.20	7.47	8.60	9.17	7.73	.....	7.66	7.95	7.75	8.52	.....	13.52	.....	.....
Los Angeles	.10	8.05	10.00	11.00	8.35	.....	8.05	8.30	8.05	11.25	.....	14.25	.....	17.85
Memphis	.10	7.12	8.25	.....	7.38	.....	7.31	7.60	7.40	9.15	.....	.....	.....	.....
Milwaukee	.25	6.89	8.18	8.59	7.15	.....	7.08	7.45	7.17	7.94	.....	12.94	.....	15.99
New Orleans	.15	7.20	8.35	.....	7.45	.....	7.40	7.70	7.50	9.50	.....	.....	.....	.....
New York	.10	7.46	8.68	9.44	8.07	9.95	7.76	7.99	7.96	9.48	13.63	13.28	16.48	16.33
Norfolk	.20	7.25	.....	.....	7.65	.....	7.45	7.95	7.65	9.50	.....	.....	.....	.....
Philadelphia	.10	7.14	8.42	9.35	7.67	.....	7.37	7.74	7.64	8.46	13.51	13.16	16.36	16.21
Pittsburgh	.25	6.80	8.09	9.20	7.16	9.00	6.99	7.25	7.08	7.85	13.20	12.85	16.05	15.90
Portland	.....	7.80–8.60	8.88	10.65	8.00	.....	7.75	7.85–8.15	7.95	12.20	.....	15.00	.....	17.50
Salt Lake City	.20	.....	10.00	.....	9.35	.....	.....	9.20	9.15	.....	.....	.....	.....	.....
San Francisco	.10	8.10	9.65	10.15	8.35	.....	8.05	8.25	8.05	11.20*	.....	14.25	.....	17.85
Seattle	.80	8.55	10.40	10.80	8.65	.....	8.20	8.30	8.35	11.70	.....	14.60	.....	17.65
St. Louis	.25	7.00	8.38	9.19	7.35	.....	7.28	7.68	7.37	8.14	13.49	13.14	16.35	16.19
St. Paul	.25	7.46	8.59–9.14	9.16	7.72	.....	7.65	7.94	7.76	8.51	.....	13.51	.....	16.28

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

Exceptions: (1) 1500 to 9999 lb. (2) 1000 lb or over. (3) $.25 delivery. (4) 1000 to 1999 lb, $.25 delivery.

* Plus analysis charge.

Miscellaneous Prices

(Effective Nov. 1, 1955)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb
18	4	1	—	—	$1.60
18	4	1	—	5	3.305
18	4	2	—	—	1.765
1.5	4	1.5	8	—	.96
6	4	2	6	—	1.35
6	4	2	5	—	1.105

High-carbon chromium ..... .77
Oil hardened manganese ..... .42
Special carbon ..... .39
Extra carbon ..... .33
Regular carbon ..... .275

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb. f.o.b.

	Cladding	Plate (*A5, J2, L4*) 10 pct	15 pct	20 pct	Sheet (*I2*) 20 pct
Stainless Type	304	30.30	33.15	36.05	32.50
	316	35.50	38.45	41.40	47.00
	321	32.00	34.85	37.75	37.25
	347	34.40	37.90	41.40	48.25
	405	25.88	29.60	33.35	.....
	410, 430	25.30	29.10	32.85	.....

CR Strip (*B9*) Copper, 10 pct, 2 sides, $8.00; 1 side, $0.00.

LAKE SUPERIOR ORES

$1.50% Fe; natural content, delivered lower Lake ports. Prices effective for 1955 season.

	Gross Ton
Openhearth lump	$11.25
Old range, bessemer	10.40
Old range, nonbessemer	10.25
Mesabi, bessemer	10.25
Mesabi, nonbessemer	10.10
High phosphorus	10.00

COKE

Furnace, beehive (f.o.b. oven)	**Net Ton**
Connellsville, Pa.	$14.00 to $14.50
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	$16.00 to $16.50
Foundry, oven coke	
Buffalo, del'd	$28.05
Chicago, f.o.b.	25.75
Detroit, f.o.b.	26.25
New England, del'd	26.05
Seaboard, N. J., f.o.b.	25.50
Philadelphia, f.o.b.	25.00
Swedeland, Pa., f.o.b.	25.00
Plainesville, Ohio, f.o.b.	25.50
Erie, Pa., f.o.b.	25.00
Cleveland, del'd	27.43
Cincinnati, del'd	26.56
St. Paul, f.o.b.	23.75
St. Louis, f.o.b.	26.00
Birmingham, f.o.b.	$4.40
Lone Star, Tex., f.o.b.	19.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	Length (In.)	Price	CARBON* Diam. (In.)	Length (In.)	Price
24	84	23.00	40	100, 110	9.90
20	72	22.25	35	110	9.90
16 to 18	72	22.50	30	110	10.05
14	72	23.00	24	72 to 84	10.20
12	72	23.50	20	90	10.10
10	60	24.25	17	72	10.35
7	60	24.50	14	72	10.85
6	60	27.25	12	60	11.75
4	60	30.25	10	60	11.80
3	60	32.00	8	60	12.10
2½	30	33.75			
2	24	52.50			

* Prices shown cover carbon nipples.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts

	Case Discount over 20,000 lb.	under 20,000 lb.
½ in. & smaller x 6 in. & shorter	61	63
Larger than ½ in. diam. and all diam. longer than 6 in.	55	57
Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter	61	63
Lag, all diam. x 6 in. & shorter	61	63
Lag, all diam. longer than 6 in.	55	57
Plow bolts	61	63

Nuts, Hex., H.P., reg. & hvy.

⅝" or smaller	64	66
⅞" to 1⅛" inclusive	63	65
1¼" to 1½" inclusive	65	67
1⅝" and larger	61	63

C.P. Hex. regular & hvy.

⅝" or smaller	64	66
⅞" and larger	61	63

Hot Galv. Nuts (all types)

1½" or smaller	44	47

Finished, Semi-finished, Hex. Nuts

¾" and smaller	66	66
⅞" and larger	63	63

* Broken cases 25% more.

Rivets

	Base per 100 lb
½ in. and larger	$9.95
	Pct Off List
7/16 in. and smaller	32

Cap Screws

	Discount Bright	H.C. Heat Treated
New std. hex head, packaged ¼" thru ½" diam. x 6" and shorter	34	20
9/16 and ⅝" x 6" and smaller and shorter	31	16
¾", ⅞", 1" x 6" and shorter	8	+11
New std. hex head, bulk* ¼" thru ½" diam. x 6" and shorter	49	41
9/16" and ⅝" diam. x 6" and shorter	48	39
¾", ⅞", 1" x 6" and shorter	31	20

*Minimum quantity per item:
15,000 pieces ¼", 5/16", ⅜" diam.
5,000 pieces 7/16", ½", 9/16", ⅝" diam.
2,000 pieces ¾", ⅞", 1" diam.

Machine Screws & Stove Bolts

	Quantity	Discount Mach. Screws	Stove Bolts
Packaged, package list		27	38
Bulk, bulk list			
¼-in. diam. & under	25,000-200,000	20	61
5/16-in. diam. & larger	15,000-100,000	20	61
All diam. over 3 in. long	5,000-100,000	—	61

Machine Screw & Stove Bolt Nuts

	Quantity	Discount Hex	Square
Packaged, package list		24	27
Bulk, bulk list			
⅜-in. diam. & smaller	25,000-200,000	18	20

CAST IRON WATER PIPE INDEX

Birmingham	109.8
New York	121.5
Chicago	122.9
San Francisco-L. A.	131.1

Oct. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1 issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick	*Carloads per* 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$122.00
No. 1 Ohio	114.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	98.00
No. 2 Ohio	
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	16.00

Silica Brick	
Mt. Union, Pa., Ensley, Ala.	$128.00
Childs, Hays, Pa.	133.00
Chicago District	128.00
Western Utah	144.00
California	151.00
Super Duty	
Hays, Pa., Athens, Tex., Windham, Warren, O.	145.00
Curtner, Calif.	168.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	$1.00
Silica cement, net ton, bulk, Hays, Pa.	$4.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	$3.00
Silica cement, net ton, bulk, Utah and Calif.	32.00

Chrome Brick	*Per net ton*
Standard chemically bonded, Balt.	$91.00
Standards chemically bonded, Curtner, Calif	101.25
Burned, Balt.	85.00

Magnesite Brick	
Standard Baltimore	$114.00
Chemically bonded, Baltimore	102.00

Grain Magnesite	*St. ⅜-in. grains*
Domestic, f.o.b. Baltimore in bulk fines removed	$64.40
Domestic, f.o.b. Chewelah, Wash., Luning, Nev.	
in bulk	48.00
in sacks	46.00

Dead Burned Dolomite	*Per net ton*
F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$18.00
Midwest	15.60
Missouri Valley	14.00

METAL POWDERS

Per pound, f.o.b. shipping points, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	11.25¢
Canadian sponge iron, Del'd in East, carloads	11.50¢
Domestic sponge iron, 98+% Fe, carload lots	9.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	37.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	22.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 00.8+% Fe	$1.0¢ to $1.48
Aluminum freight allowed	34.50¢
Brass, 10 ton lots	37.50¢ to 50.00¢
Copper, electrolytic	38.75¢
Copper, reduced	38.75¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99% min., and quality, del'd	$2.60
Lead	7.50¢ plus metal value
Manganese	70.0¢
Molybdenum, 99%	$3.00 to $3.25
Nickel, unannealed	$1.00
Nickel, annealed	$1.06
Nickel, spherical, unannealed, 2#80	$1.18
Silicon	43.50¢
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	91.0¢
Stainless steel, 316	$1.10
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$4.50
Zinc, 10 ton lots	18.75¢ to 23.50¢

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Ferroalloy Prices

(Effective Nov. 1, 1955)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd, 67-71% Cr, .50-1.00% max. Si.

0.03% C ... 38.50	0.20% C ... 35.50
0.06% C ... 36.50	0.50% C ... 35.25
0.10% C ... 36.00	1.00% C ... 34.00
0.15% C ... 35.75	2.00% C ... 33.75

4.00-4.50 C, 67.70% Cr, 1-2% Si.... 36.25
3.50-5.00% C, 57-64% Cr, 2.00-4.00% Si 25.00

S. M. Ferrochrome

Contract prices, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	28.65
Ton lots	30.55
Less ton lots	32.05

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 3¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.27
0.50% max. C	1.27
9 to 11% C, 88-91% Cr, 0.75% Fe..	1.36

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 8-in. x down, per lb of Cr, packed.

Carloads	41.35
Ton lots	46.15
Less ton lots	48.65

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.

30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	22.95
Ton lots	25.25
Less ton lots	26.75

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	23.95
Ton lots	24.95
Less ton lots	25.95

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ¼ in. x 12 mesh.

Ton lots	19.65
Less ton lots	20.90

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5: 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	16.60
Ton lots	18.10
Less ton lots	19.35

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	17.50
Ton lots to carload packed	18.25
Less ton lots	19.50

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	9.50
Clairton, Pa.	9.50
Sheridan, Pa.	9.50
Philo, Ohio	9.50

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	12.10
Ton lots packed	14.30

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$86.00
19 to 21%	3% max.	88.00
21 to 23%	3% max.	90.50

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.00
Ton lots	43.50

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	30.00
Ton lots	32.00
250 to 1999 lb	34.00
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn... 21.85

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	32.00	33.85	35.05
0.07% max. C	29.95	31.80	33.80
0.15% max. C	28.45	30.30	31.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si ...	23.45	25.30	26.50

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.

Carload bulk	11.20
Ton lots	12.65
Briquet contract basis carloads, bulk, delivered, per lb of briquet	12.70
Ton lots, packed	14.90

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $90.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $90.50. Add $1.00 per ton for each additional 0.50% Si up to and including 17%. Add $1.45 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96.50% Si, 2% Fe ...	22.75	21.45
98% Si, 1% Fe	23.25	21.95

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.75
Ton lots, packed	9.35

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.

50% Si ...	11.75	75% Si ...	15.40
65% Si ...	14.50	85% Si ...	17.10
		90% Si ...	18.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots..	2.40	3.30	4.55

Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.

Openhearth	3.10
Crucible	3.10
High speed steel (Primos)	3.30

Alsifer, 20% Al, 40% Si, 40% Fe,

Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.35¢
Ton lots	11.50¢

Calcium molybdate, 46.3-46.6%

f.o.b. Langeloth, Pa., per pound contained Mo $1.38

Ferrocolumbium, 50-60%, 2 in. x D

contract basis, delivered per pound contained Cb.

Ton lots	$6.90
Less ton lots	6.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C,

contract basis, del'd, ton lots, 2-in. x D per lb con't Cb plus Ta.... $4.65

Ferromolybdenum, 55-75%, 200-lb

containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.46

Ferrophosphorus, electric, 23-26%,

car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton..... $90.00
10 tons to less carload..... $110.00

Ferrotitanium, 40% regular grade,

0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.35

Ferrotitanium, 25% low carbon,

0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.50
Less ton lots..... $1.55

Ferrotitanium, 15 to 18% high

carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton..... $177.00

Ferrotungsten, ¼ x down,

packed, per pound contained W, ton lots, f.o.b..... $3.45

Molybdic oxide, briquets, per lb

contained Mo, f.o.b. Langeloth, Pa. $1.27
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.24

Simanal, 20% Si, 20% Mn, 20%

Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump	15.50¢
Ton lots, packed lump	16.75¢
Less ton lots	$1.55

Vanadium oxide, 86-89% V_2O_5

contract basis, per pound contained V_2O_5 ..... $1.33

Zirconium contract basis, per lb of alloy

35-40%, f.o.b. freight allowed, carloads, packed	26.25¢
12-15%, del'd, lump, bulk-carloads	8.50¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B, 3.14%, Si, 40-45%, per lb contained B.... $5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed
Ton lots per pound ..... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50%, max. Al, 0.50% max. C, 1 in. x D, ton lots.... 1.20
F.o.b. Wash., Pa.; 100 lb up

10 to 14% B	.85
14 to 19% B	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

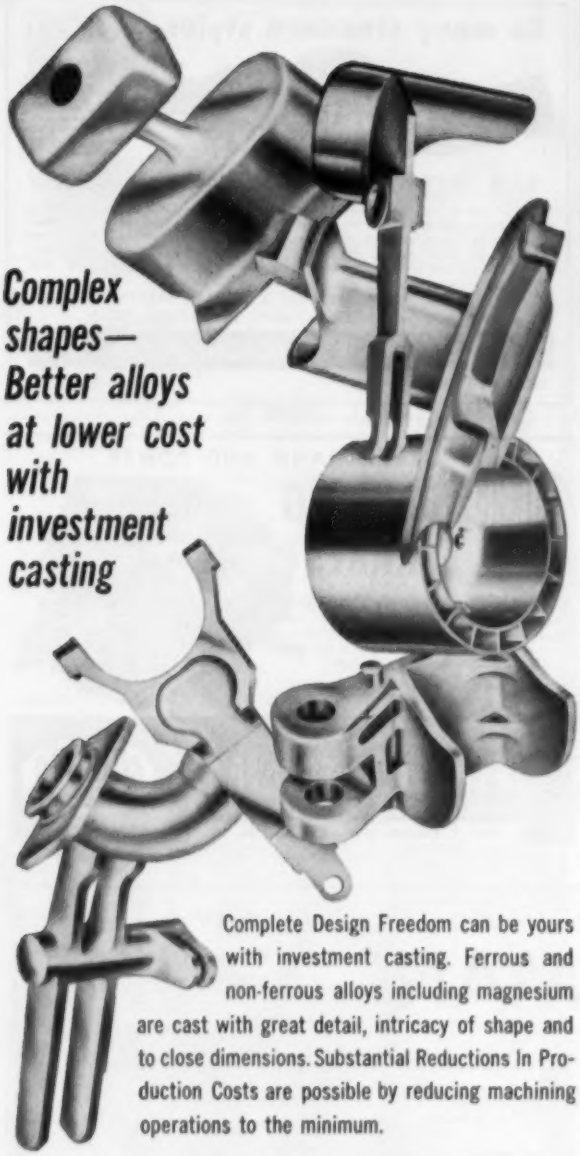
No. 1	$1.00
No. 79	50¢

Manganese-Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.46
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots..... $2.05

Silcax, contract basis, delivered.
Ton lots ..... 45.00¢



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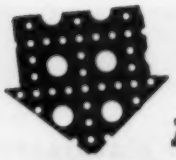

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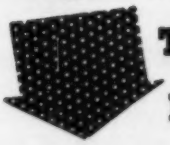

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THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Ohio Outlook . . . Toledo, long touted as "the stamping ground of the world," is still living up to its name as far as good used metal stamping equipment is concerned. Late model, reconditioned stamping equipment there is selling for from 50 pct to 75 pct of the cost of new machinery with choice pieces always finding a ready market.

Paul Connell of Connell Machinery Co., Toledo, told THE IRON AGE last week, "We are finding a high market on good grade sheet metal presses and stamping machines as well as the tool making equipment for turning out the dies to go with it. But with the exception of turret lathes, most production machinery is off badly. It's going for only about 30 pct of the cost of new equipment here in Toledo. This applies principally to automatic lathes, automatic screw machines, production milling machines and the like. Turret lathes, however, are finding a far steadier market because they are more adapted to do a variety of jobs such as you'll find in job shops around the Toledo area. A smaller firm can get more utilization out of them than a straight line production machine."

Heavy Presses Tight . . . Hardest type of equipment to find in the Toledo area is late model (10 years or less) heavy presses from 150 tons up. With the great increase in auto, appliance and other subcontract stamping and forming, most existing machines are being used to the fullest extent. Only where some company decides to make a major investment in a new press to get faster output, more precise control or a larger product, do these machines become available. Those in good shape are reconditioned and find a ready market.

The high cost of labor and materials in relation to prices of the equipment made Connell Machinery some years ago decide to go out of the complete rebuilding of machines. In this type of work the machines are completely disassembled down to the base and all wearing surfaces replaced. Connell feels that the cost of doing a complete job of this on used machinery prices it out of the market.

Do Thorough Reconditioning . . . A thorough reconditioning job is done on all machines including tearing down, thorough checking and replacement of worn and broken parts. They are then sold on a money-back guarantee which permits the purchaser to return all merchandise freight prepaid, within 30 days for full refund if unsatisfactory in any way. Although the ethical code of the Machinery Dealers National Assn. only calls for this money-back guarantee if the machine is mechanically unsatisfactory, Connell says his firm and most other members exceed the minimum requirements by taking machines back if unsatisfactory for any reason.

Limit Detroit Buys . . . Although a good part of used Detroit machinery might be expected to filter into Toledo, only 57 mi. away, most dealers there shy away from it. Major reason is that Detroit equipment is highly specialized for a single auto part production job only. As such it is difficult to adapt many of them to general purpose work. In addition they are given such severe use in turning out auto parts that rebuilding and reconditioning are economically unfeasible for later sale on the open market. In some isolated cases, however, machine shops can pick up bargains through low-commission brokers in Detroit and in their own shops adapt the machinery to their special uses and projects.

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No. 3 Niagara Angle Bending Roll
No. 3 Buffalo Angle Bending Roll
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8' x ¼" Dreis & Krump Size 186
12' x ¼" Dreis & Krump, Motor Driven
BRAKES—PRESS TYPE
12' All Steel Press Brake, 250 ton Capacity
BROACH
Model VP-4-40-40 American Vertical Hydr. Broach, Max. Capacity 60 ton, Stroke 40", Motor Drive
BULLDOZER
#9 W&W Mechanical Bulldozer, 28" Stroke, Face of Crosshead 24"x20"x108", 50 H.P. A.C. Motor
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5 ton P&H	29' Span 230 Volt D.C.
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5 ton Northern	57' Span 220/3/60 A.C.
5 ton Cleveland	96' Span 230 Volt D.C.
7½ ton P&H	63' Span 440/3/60 A.C.
10 ton Niles	52' Span 230 Volt D.C.
10 ton P&H	96' Span 220 Volt D.C.
15 ton P&H	56' Span 230 Volt D.C.
20 ton P&H	60' Span 230 Volt D.C.
20 ton Toledo	75' Span 550/3/60 A.C.
30 ton Shaw	60' Span 230 Volt D.C.
120 ton Whiting With 10 ton Auxiliary	80' Span 220/3/60 A.C.

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1" to 5" Acme, Ajax, National
1", 4", 5", 7½" National High Duty, Air Clutch
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STEAM FORGING—600 lb. to 20,000 lb.
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#50 Knight Jig Borer, Complete—New 1950
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52" McKay 17 Rolls 3⅜" Dia.
60" Aetna Standard 17 Rolls 4⅛" Dia.
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2045 ton Birdsboro, 4-Columns, 14" Stroke Platen 42" x 49", Daylite 47"
4500 ton B-L-H Hydr. Forging Press
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Baird 12 Station Model 4-37 Automatic Multiple Transfer Press, 30 ton Capacity
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Style W Cleveland Single End, 60" Throat, 312 Ton
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No. 5N Nazel, self-contained.
No. 6B Nazel, self-contained.

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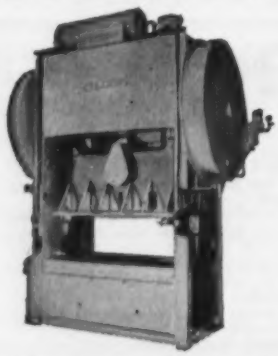

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Qu.	H.P.	Make	Type	Volts	RPM
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1	2200	G.E.	MCF	600	400/500
2	1500	Whse.	Rev.	600	600
1	1400	G.E.	MCF	600	63/120
1	1200	G.E.	MCF	600	750/950
1	1000	G.E.	MCF	600	350/700
1	940	Whse.	GM	250	140/170
1	800	Whse.		250	450/550
1	600	Al. Ch.		250	400/600
1	500	Whse.	CC-216	600	300/900
1	500	G.E.	MCF	250	300/900
3	450	Whse.		550	415
1	350	Whse.		250	350/900
1	350	G.E.	MPC	230	400/600
1	200	Rel	1970T	230	720
1	200	G.E.	CD-1636Z	230	500/1500
1	200	Whse.	CB-5113	230	400/800
1	150	G.E.		600	250/750
1	150	Cr. Wh.	85H	230	1150
6	150	Cr. Wh.	83H-TEFC	230	890
1	150	Whse.	SK-151B	230	900/1800
1	150	Whse.	SK-201	230	350/950
1	120	G.E.	MCF	230	250/1000
1	125	Whse.	SK-161	230	500/1500
1	125	Whse.	SK-183	230	850

M-G Sets—3 Ph. 60 Cy.

Qu.	K.W.	Make	RPM	D.C. Volts	A.C. Volts
2	2000/2400	G.E.	450	250/300	2200/4800
1	1750/2100	G.E.	514	250/300	2300/4600
1	2000	G.E.	600	25cy 600	11500
1	2000	G.E.	514	600	6600/13200
1	1500	G.E.	720	600	6600/13200
1	1500	C.W.	514	30/115	4600/13000
1	1000	G.E.	720	600	2300/4600
2	750	G.E.	720	275	2300/4600
1	750	C.W.	514	30/115	2300
1	750	Whse.	900	250	2300/4000
1	600	G.E.	720	250	140/2300
1	500	Whse.	900	250	2300/4000
1	300	Whse.	1200	250	208/440/550

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
2	4300	G.E.	FOVT	3	18500x115/200
1	2000	Wagner	HPW-20	3	26400x2400
3	1000	G.E.	HVDDJ	1	2400x480
4	1000	Wagner	OISC	1	13200x460
1	667	G.E.	HD	1	13800x2300

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DIRECT CURRENT MOTORS

Qu.	H.P.	Make	Type	Volts	R.P.M.
2	2000	Whse.	Mill	525	600
6	1500	Whse.	Mill	525	600
1	1250	G.E.	MCF	600	350/700
4	800	Whse.	Exct.	525	600
4	700	Whse.	Mill	250	300/700
2	600	Al. Ch.	Mill	600	300/600
3	500	Whse.	Mill	250	285/710
1	450/250	Al. Ch.	Mill	575/250	250/1000
1	350	G.E.	CD-169-A	230	1150
1	200/250	El. Dy.	Size #23	230	400/1200
1	180	G.E.	MPC	250	400
1	160/90	G.E.	MPC	250	1125/625
1	150	Whse.	SK-201	230	300/900
2	125	Whse.	SK-184	230	575/850
1	125	Whse.	SK-199	550	600
1	120	G.E.	MPC	230	400/600
4	100	El. Dy.	S-30	230	450/1350
3	50	Whse.	SK-131.5	230	400/2200
1	40	G.E.	CD-122	230	500/1000
1	40	Rel.	651-T	230	250/1000
1	35	Whse.	SK	230	250/1000
1	32½	Whse.	SK-150	230	400/1200
3	25	Whse.	SK-90	230	1800
1	15	G.E.	CD-85	230	575/2300
2	15	Whse.	SK-103	230	400/1600
4	10	Whse.	SK-91	230	250/1000
4	5/7½	Rel.	T.E.F.C.	230	837/1350

TRANSFORMERS
Outdoor Type O.I.S.C.

Qu.	KVA	Make	Phase	Voltage
6	1000	Al. Ch.	1	23,000/20,700-2300/4600
3	400	Whse.	1	23,000-2300/4000
3	333	G.E.	1	13,200/11,880-2300/4000
1	300	G.E.	3	13,000/6900-240/480
1	300	Whse.	3	11,500-480
2	150	G.E.	3	2400/4160-240/480
2	100	G.E.	1	23,000/20,700-2300
1	100	G.E.	1	4160-120/240

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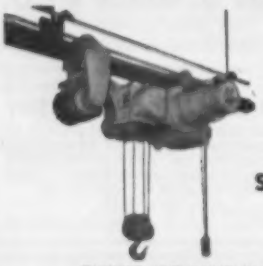
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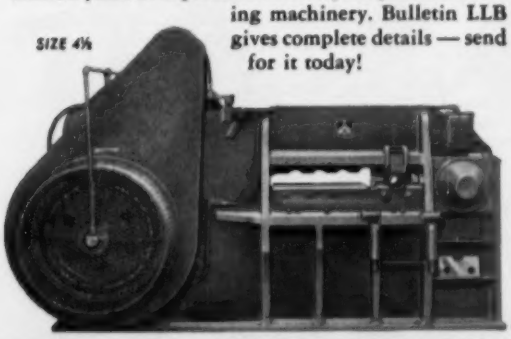

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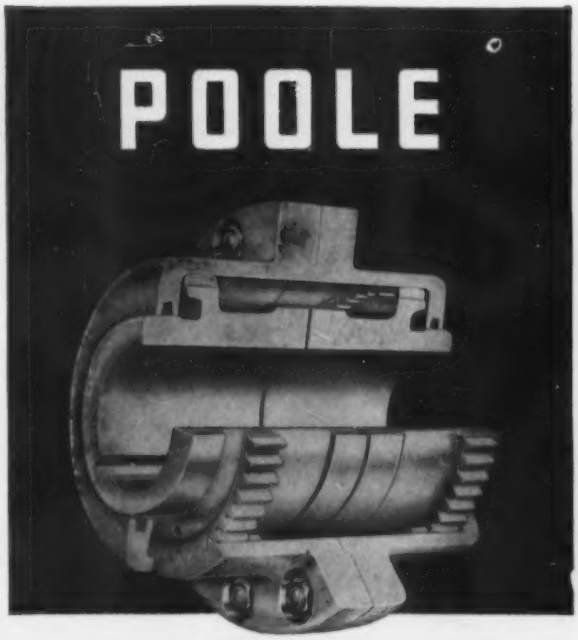

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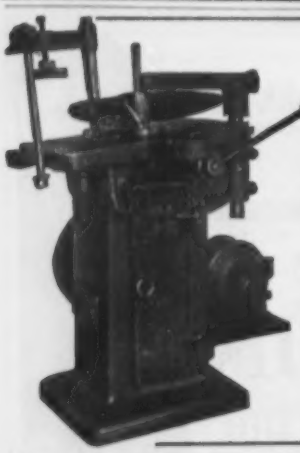

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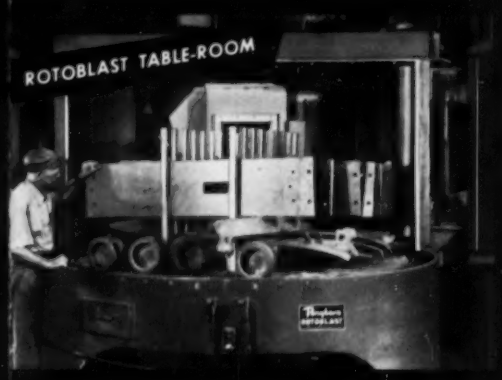

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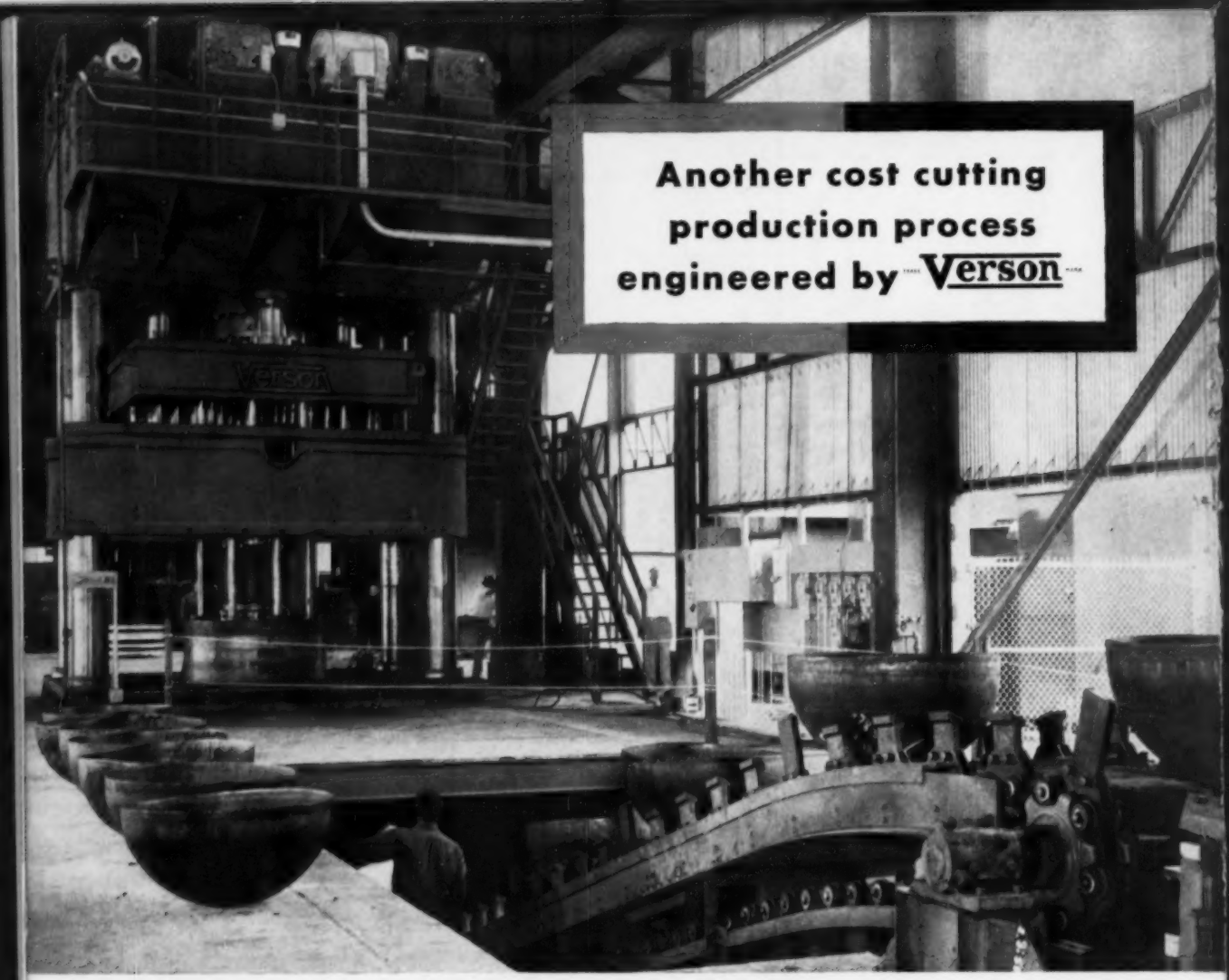

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